

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

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EDITORIAL COMMENT



It is a very comforting and interesting comment on the changed attitude towards flying in recent years that at the moment there seems to be no event in the air which calls for much comment or explanation. Yet things are happening, or have just happened, any one of which would a few years ago have called for flaring headlines in all the daily papers, and for serious and thoughtful comment in technical flying journals. How very short a time ago it seems when all the world was thrilled by a cross-Atlantic flight by Col. Charles Lindbergh! Now, accompanied by Mrs. Lindbergh, he is winging his way in leisurely fashion across most formidable stretches of the globe without causing the pulse of any news editor to beat faster than the normal. Yet the flight across the Pacific via the Aleutian islands is an adventure full of peril which has been accomplished by very few men. Now an aeroplane, with a lady as passenger in it, makes this crossing, and the feat is accepted almost as a matter of course. Kingsford Smith is scorning delights and flying laborious days in the effort to lower the record between Australia and England. But new records on that route fail to tickle the jaded palates of news editors. A few years ago a good million of sober British citizens turned out to watch Sir Alan Cobham come home from a long flight. Yet the other day he came home once more from a flight across parts of Africa which was surely full of interest; and not a dog barked. How many readers of the popular papers, we wonder, or even readers of *FLIGHT* for that matter, could say off-hand where Sir Alan has been and what he did there. Miss Amy Johnson dropped in to tea at Tokyo the other day, and apparently looked very charming in a kimono, but did not distract attention from another sort of flight—the flight from the £. The airship *Graf Zeppelin* has made another flight across the Atlantic to South America and back. There was a time when such a flight by an airship thrilled the whole world to the core. Now the casual remark, "Dr. Eckener has done it again; he always does," is the passing tribute of the man in the train. Major James Doolittle, a Schneider winner, has crossed the

All Quiet on the Air Front

DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1931

- Oct. 3. Cardiff Ae.C. Air Pageant at Splott Aerodrome.
- Oct. 3-4. International Gliding Competition, Balsdean, Sussex.
- Oct. 8. Balloon Ascent, Lecture by Prof. Piccard before R.Ae.S.
- Oct. 15. "Protection of Metals in Aircraft Construction," Lecture by H. Sutton before R.Ae.S.
- Oct. 27. "By Air to Baghdad," Lecture by Mrs. Pender Chalmers, at the Electrical Association for Women, 15, Savoy St., Strand, W.C.2 (3 p.m.).
- Oct. 29. "Accidents in Civil Aviation," Lecture by Capt. A. G. Lamplugh before R.Ae.S.
- Nov. 5. "Safety in Spinning," Lecture by H. B. Irving before R.Ae.S.
- Nov. 19. "Aircraft Vibration," Lecture by H. Constant before R.Ae.S.
- Dec. 3. "Wheel Brakes and Undercarriages," Lecture by S. Scott Hall before R.Ae.S.
- Dec. 10. "Air Flow—Demonstrations on the Screen by Means of Smoke," Lecture by W. S. Farren before R.Ae.S.
- Dec. 17. "Control Beyond the Stall," Lecture by Dr. G. V. Lachmann before R.Ae.S.

1932

- Jan. 14. "Interference," Lecture by E. Ower before R.Ae.S.
- Jan. 28. "Effect of Height on Range," Lecture by A. E. Woodward-Nutt and Flt.-Lt. A. F. C. Scroggs before R.Ae.S.
- Mar. 10. "Results with the New Wind Tunnel at N.P.L.," Lecture by E. F. Relf before R.Ae.S.

United States in 11 hours at an average speed of 230 m.p.h.; Mr. Broadbent has made a new record for a flight round Australia by covering 7,600 miles in 7 days 8 hours; Herr von Grönau has unostentatiously made a survey trip from Berlin to Greenland and on to Chicago; yet none of these fine feats has proved to have a first-class news value. Even the reported loss of two machines, which were attempting Atlantic and Pacific flights, and the subsequent discovery of all five men alive, has passed almost unnoticed. How different from the days, a short 12 years ago, when Hawker and Mackenzie Grieve were reported overdue! A Saro flying boat of the Royal Air Force, with six men on board, has made a non-stop flight from Gibraltar to Plymouth, thus linking the British Isles with our nearest overseas possession; but most of the public are blissfully unaware that such an interesting demonstration has even taken place.

In fact, the last few weeks have been crammed with flying events which, varying in importance though they are, would one and all have been hailed a few years ago as events of the greatest public interest, but which are now accepted as a matter of course. The change must be disappointing to the heroes of the flights, who would once have received public acclamation and possibly official decorations, but who now find that flying virtue must be its own reward. Yet this change of mood is in reality very gratifying to those who have the interests of flying at heart. The victory of the aeroplane (and of the *Graf Zeppelin*) is accepted. The public is not surprised to find that it can make surprisingly long flights in a surprisingly short time. That is the public attitude which we have long wished to see adopted. The avowed "stunt" flyer now has to do something very much out of the ordinary to attract attention to himself or herself; and that too is very much to the good. Even a crash has to be particularly shocking to occupy as much attention as is given to the common or garden railway accident or shipwreck. Flying is finding its rightful place in the popular estimation.

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Despite what is written above, a world's speed record always stands out as an event of first-class importance. The whole nation is thrilled with pride on learning that our chosen pilot, Flight-Lieutenant George Stainforth, has succeeded in flying the three-kilometre course four times at an average speed of 408.8 m.p.h. He is the first man in the world to have flown under official timing at that truly amazing speed. The record speeds on land, on water, and in the air, are all eagerly coveted by the nations, but the speed in the air is the greatest of these and therefore brings the highest honour.

Frankly, the result is a surprise to us. Though, during the Schneider training, non-technical reporters talked glibly of 400 m.p.h., we knew that with the type of engine which was to be used in the contest this speed was impossible. The one engine specially tuned for the three-kilometre flight, together with just the right fuel mixture and just the right type of propeller, has surpassed our expectations. The problem of the propeller must have been a very complicated one, and doubtless its correct solution has played an extremely important part in this splendid result.

We may now rest for a while on our laurels. It will be some considerable time before any other nation surpasses Stainforth's record by the necessary five kilometres per hour. In quality of our machines, our engines, and our pilots, we may justifiably boast that Great Britain now holds unquestioned first place in the world.

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It is no easy matter to answer exhaustively the question whether or not the Schneider Contests have been worth while. Before one can begin to answer that it is necessary to define from what point of view its value is to be judged. As a sporting event, which the Schneider Contests were originally, it had, we think, ceased long ago to be worth while. The Schneider ceased to be a sporting event in 1923, when the United States challenged with service aircraft and service pilots, brought over in a U.S.N. vessel.

It is from the technical point of view that one should attempt to judge the Schneider Contests since 1923. Has the effort in work, and the toll in lives, justified what has been spent? Two articles published in *FLIGHT* this week, read in conjunction with the figures given two weeks ago relating to the speeds in the Schneider Contest and that in the world's speed record attempt, help very materially to answer the question in the affirmative. It will probably be readily agreed that the engine designer's task is very much more difficult, and certainly a great deal more costly, than the aircraft designer's. The article on the Rolls-Royce "R" engine development will show some of the problems that had to be solved. It also indicates that the marvellous power of 2,300 b.h.p. was achieved at a speed of 3,200 r.p.m. and a weight of less than $\frac{3}{4}$ lb. per horse-power. Some of the design "dodges" which made this astounding result possible are referred to in the article. About some of the others the firm maintains a discreet silence, but it is not to be doubted that a great deal of what has been learnt, and learnt in a very short space of time, will be made full use of in the Rolls-Royce service types of engines of the near future. And but for the Schneider Contests all this experience would have taken many years to accumulate.

On the aircraft side we have proved the possibility of getting into the air and on to the water again at far higher speeds than we had hitherto attempted. While this is not, perhaps, likely to influence the permissible alighting speed of service aircraft, it caused to be solved several problems incidental to such speeds. Float design has benefited materially, due to the urgent necessity of reducing air drag to a minimum while at the same time maintaining good behaviour on the water. Controls and the balancing, statically and aerodynamically, of control surfaces at speeds not previously reached were thoroughly tried out and made satisfactory. Again useful lessons have been learnt. Problems of cooling, far more severe because of the very great horse-power, than met with in service types of aircraft, were tackled and overcome. Surface types of radiators were evolved, so that if at any time it should be desired to incorporate them on military types for greater performance, most of the attendant problems have already been solved. Altogether the British aircraft industry has gained in prestige and knowledge much that would not have been gained otherwise, or at least not for some considerable time.

The Supermarine S.6 B Monoplane

Main Particulars Published
for the First Time

HITHERTO it has not been possible to publish the data relating to the S.6B. monoplanes designed and built by the Supermarine Aviation Works for the 1931 Schneider Contest. The general appearance of the machines has been shown in the innumerable photographs which have been published all the world over, but essential data, such as weight, etc., have been kept secret. It has now become permissible to give such data, so that, taken in conjunction with the article on the Rolls-Royce "R" engines on pp. 989-995, it is now possible, for the first time, to form a true picture of the achievement of all concerned in the production of the British 1931 Schneider defenders.

It has already been recorded in *FLIGHT* that, when Lady Houston came forward with her magnificent offer of £100,000 for the building of new machines and engines for this year's Contest, time was getting so short that neither the Supermarine Aviation Works nor Rolls-Royce, Ltd., had time to produce entirely new designs, but had to do the best possible in the time available with the 1929 machines and engines. Some of the difficulties encountered by the Rolls-Royce firm are set out in the article referred to above. In the following

will be found a brief outline of the improvements made by the Supermarine Aviation Works, and which resulted in the production of the 1931 S.6B. monoplanes.

Although the 1931 machines were generally similar to the 1929 type, it was found that detail improvement in the following items could be made: The oil system, the water system, the fuel system, the floats, and the aircraft controls.

The Oil System.—In the S.6B. machines the oil system is, as before, housed entirely in the fuselage. When the oil leaves the engine, it is forced along the fuselage side coolers to the top of the fin tank. By an arrangement of ribs and gutters, the oil is kept in contact with the shell as it falls to the normal level and passes through a filter into the return (suction) cooler, which is built on the same lines as the side coolers, but is of greater section. Oil cooling had to be improved considerably in order to cope with the increased engine power, and it was found that

the difficulty lay not so much in transferring the heat from the cooler to the air as in transferring it from the oil to the surface of the cooler. Eventually, as a result of extensive research work carried out by the Supermarine Aviation Works and by the R.A.E., it was found possible to increase the efficiency of the coolers by as much as 40 per cent. This was done by sweating small vanes into the oilways, but a great deal of experiment was necessary before the type and pitch of vanes could be determined. Excessive restriction in the flow increased the pressure-

difference between inlet and outlet by an enormous amount. The gutters in the fin tank performed a similar duty, and the capacity of the tank itself was greatly increased to carry the additional oil required. In actual practice, the temperature drop between oil outlet and oil inlet reached 60 degrees C., a figure probably never before approached on any aircraft.

The Water System.—In order to keep the new engines at the correct temperature, it was necessary to dissipate approximately 40,000 British Thermal Units of heat per minute from the cooling surfaces. The efficiency of the wing radiators could not be improved appreciably, and, therefore, more surface had to be provided somehow. The only extra surface

available was that presented by the topsides of the floats. These were covered with radiators instead of the usual shell plating, and the addition of this extra cooling surface was very effective. A new type of header tank with a steam separator was designed to prevent any loss of water. In other respects the water system was unaltered.

The Fuel System.—The fuel is carried inside the floats, and is delivered to a small pressure tank in the fuselage by engine-driven pumps. Normally the engine is fed from the pressure tank, but this is of small capacity and intended only to be adequate for the short period when the aircraft is doing a steeply-banked turn and when, due to centrifugal force increasing the weight of fuel, the pumps are unable to supply the engine. The starboard float carries much more fuel than the port, in order to offset the tremendous engine torque during take-off. The effect of full engine torque is to transfer a load of approximately 500 lb. from one float to the other.

VICKERS-SUPERMARINE S.6 B MONOPLANE 2,300 h.p. Rolls-Royce "R" Engine

Dimensions			
Wing span .. .. .	..	..	30 ft. (9.15 m.)
Wing chord .. .. .	..	..	5 ft. 8 in. (1.73 m.)
Wing area .. .. .	..	..	145 sq. ft. (13.5 m ²).
Weights			
Weight empty .. .. .	..	..	4,560 lb. (2 070 kg.)
Pilot .. .. .	..	..	160 lb. (73 kg.)
Fuel (135 gals. = 614 litres) .. .. .	..	..	1,125 lb. (512 kg.)
Oil (15 gals. = 68 litres) .. .. .	..	..	150 lb. (68 kg.)
Weight fully loaded .. .. .	..	..	5,995 lb. (2 723 kg.)
Wing loading .. .. .	..	..	41.3 lb./sq. ft. (202 kg./m ²)
Power loading .. .. .	..	..	2.6 lb./h.p. (1.18 kg./CV.).

By way of comparison it may be stated that the 1929 S.6 machines had a tare weight of 4,030 lb. and a gross weight of 5,250 lb. The wing area was the same.



EVOLUTION: On the left, one of the 1931 S.6 B machines. Next to it one of the 1929 S.6's. And on the right one of the 1927 S.5's. (FLIGHT Photos.)

The New Floats.—Extensive tests have been carried out on model floats both in the Vickers Experimental Tank at St. Albans and in the Wind Channels of the N.P.L. in order to produce floats combining the best possible compromise between aerodynamic and hydrodynamic requirements. As a result of these researches it was found possible to reduce considerably the air resistance per unit of float volume, and at the same time the take-off characteristics were materially improved, both by a reduction in hump resistance and by better stability and less tendency to "porpoising."

The fitting of water coolers on top of the floats presented considerable structural problems, as the radiators expand nearly half an inch when the water approaches boiling point. This expansion had to be allowed for in the construction of the floats, and to prevent buckling of the float planking an elastic framework construction had to be devised.

The Aircraft Controls.—On the Supermarine S.5 machines of 1927 it was found that aileron flutter developed if the controls were permitted to become slack. Calculations showed that at the increased speed of the S.6B machine there was a possibility of trouble from this source, and mass balances were, therefore, fitted as a precautionary measure to ailerons, rudder and elevators. These mass-balances were found effective, and flutter was not experienced in the machines as finished for the Schneider Contest.

THE NEW RECORD

Run		m.p.h.
1	.. ..	415.2
2	.. ..	405.1
3	.. ..	409.5
4	.. ..	405.4

Average of the four runs: 408.8 m.p.h.

(Subject to homologation by the F.A.I.)

AFTER delays and waits which seemed interminable, Flt. Lt. Stainforth flew six times over the speed course between Hill Head and Lee-on-Solent during the late afternoon of Tuesday, September 29. The special Rolls-Royce engine reserved for this second attempt had been installed during the previous Sunday, and it was hoped that the flight would be made on Monday, but the weather did not clear until late in the afternoon, and then it was decided that for safety's sake certain trials should first be carried out on the fuel supply system. These were necessitated by the fact that the consumption of the new fuel was very much greater than during the Schneider Contest, and there was a slight doubt as to whether the existing system could cope with this supply. The necessary tests were done, and the S.6B., S.1595, was ready early on Tuesday morning.

Once more, however, it was a case of waiting for the weather, and all day the members of the High-Speed Flight had to hang about until the mist rose, which was not until nearly 4 p.m. There were general sighs of relief when, after a flight round in the "Atlas," whose stainless-steel floats have been giving such good service, Sqd. Ldr. Orlebar, by diving over Calshot, gave the signal that everything was all right for the attempt.

Things immediately began to hum. The time-keepers were sent off in one of the Brooke Sea-Cars to Lee-on-Solent, where they had to attend the timing apparatus, check its correct functioning and report that all was set for securing the necessary photographs by means of camera guns which, in conjunction with a vibrator system of time transmission, would give, to a tenth of a second, the time of flight between the two marks. Flt. Lt. Stainforth, together with Sqd. Ldr. Orlebar, Mr. Mitchell (designer of the S.6B.), Mr. Lappin, of Rolls-Royce, and many others, went out with the machine on the pontoon to a position suitable for the take-off, while Flt. Lt. Dry, Engineer Officer of the flight, went up in the "Atlas" with the sealed barograph to cruise by the side of the course at 400 m., the height allowed for the approach.

Once more there was a period of waiting, during which all the onlookers conjectured as to the cause of the delay and wondered whether it meant that the flight was once more cancelled. Actually, the new fuel was the cause of these "wonderings," because the consumption is so colossal, being in the neighbourhood of 0.8 pt./b.h.p., that when the engine is running up and idling, a good deal

of it is not made use of, and this falls back to the base of the supercharger system. After the engine is warm, this fuel has to be drained out entirely before full throttle can be used, in order that there should be no possibility of choking the engine when opening out for the take-off.

At 5.49 p.m. Stainforth was "slipped," and took off in 43 sec. His take-off was good, although at one time he suffered from "patter," or rocking from float to float, which, however, he quickly overcame.

Conditions were by no means perfect and the visibility was poor, with the consequence that we who were watching had difficulty in following the machine more than a few miles away. After this first climb Stainforth turned in a wide sweep up towards Southampton, and then again somewhere over Hythe pier, preparatory for his first run down the course towards Lee. This run was made high and somewhat far out, and was in the nature of a test from which he could obtain airscrew data. It must be remembered that this engine had never been flown with this fuel before, and also that a differently set airscrew was being used; its performance was therefore an unknown quantity, and had to be checked before Stainforth could decide whether it was worth making further runs. Everything, however, came up to expectations, and after vanishing in the mist somewhere over Portsmouth, he came back in a steep dive before flattening out over the course. Then came four more runs, two from each end.

Speculation as to his speed was, of course, merely futile, and one reporter caused much amusement when he was heard 'phoning his estimate of the speed attained for the edification of his London readers. What we could say was that the engine sounded magnificent, as, in fact, it was, and the general consensus of opinion afterwards was that none of these engines had ever run better. The use of this somewhat revolutionary fuel, a mixture of wood alcohol, petrol and ethyl was thereby fully justified, for it was this which allowed the engine to run more efficiently and give some 300 h.p. more than during the race.

Stainforth's landing after the runs was, as usual, a masterpiece. He made a very wide sweep over Lee and Hill Head with his engine throttled back, and then came down on his glide to land out beyond the Calshot Spit lightship. He cut his engine just after touching, and got out of the cockpit to stand and wait on the floats for the speed-boat coming for him; as he did so, we could almost imagine that everything went suddenly still, so great was the contrast to the full-throated roar we had been listening to as he made his runs. Back at Calshot great enthusiasm prevailed, and everyone felt that "that was that," so to speak! One man, however, knew that his work had only just begun, and that was Mr. Cushing, who, with a small staff, was responsible for producing results from the timing apparatus. He remained firmly ensconced in his dark room at Lee, from whence, at about 3 a.m., came the news that our aircraft, engine and pilot, had pushed the world's speed record so high as to be unattainable by others for a very long while.



Air Transport



THE AIR FLEET OF IMPERIAL AIRWAYS, LTD.

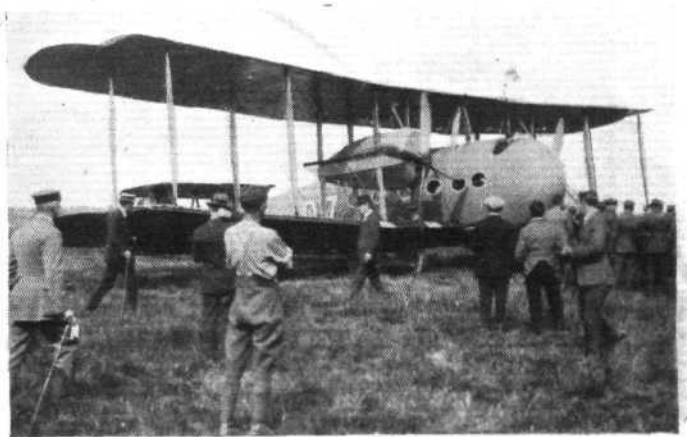
We often receive inquiries regarding the types of aircraft that have been, and are at present, used by Imperial Airways, Ltd., in the operation of their air services. In the following article our contributor records a brief history of the air fleet of Imperial Airways, from the company's formation in 1924 up to the present day, and this, together with illustrations of practically all of the types referred to, will, we think, prove of great interest to many of our readers.



THE HANDLEY PAGE W.8B: This machine was a 14-passenger, twin-engined (Rolls-Royce "Eagle") biplane, originally in service with Handley Page Transport, in 1922. (FLIGHT Photo.)

IMPERIAL AIRWAYS, LTD., was formed on April 1, 1924, by the amalgamation of Handley Page Transport, Ltd., the Instone Air Line, Ltd., the Airway Department of Daimler Hire, Ltd., and the British Marine Air Navigation Co., Ltd., which companies had hitherto operated the London-Continental and Channel Islands services. The fleet, which consisted of thirteen aircraft taken over from those four companies, was as follows:—Handley Pages G-EBBG, G-EBBH and G-EBBI from Handley Page Transport, Ltd.; De Havilland 34's G-EBBR, G-EBBT, G-EBBV and G-EBBW, and also the Vickers "Vimy" G-EASI from the Instone Air Line, Ltd.; De Havilland 34's G-EBBX, G-EBBY and G-EBCX from Daimler Hire, Ltd.; and Supermarine "Sea Eagles" G-EBGR and G-EBGS from the British Marine Air Navigation Co., Ltd.

The Handley Pages were of the W.8.B type, were fitted with twin 350-h.p. Rolls-Royce "Eagle VIII" motors and had been in constant operation on the London-Paris service since the early summer of 1922. These machines had a carrying capacity of 14–12 passengers and two crew—a maximum speed of 104 m.p.h., and were the largest machines in regular air-line operation in Europe at that



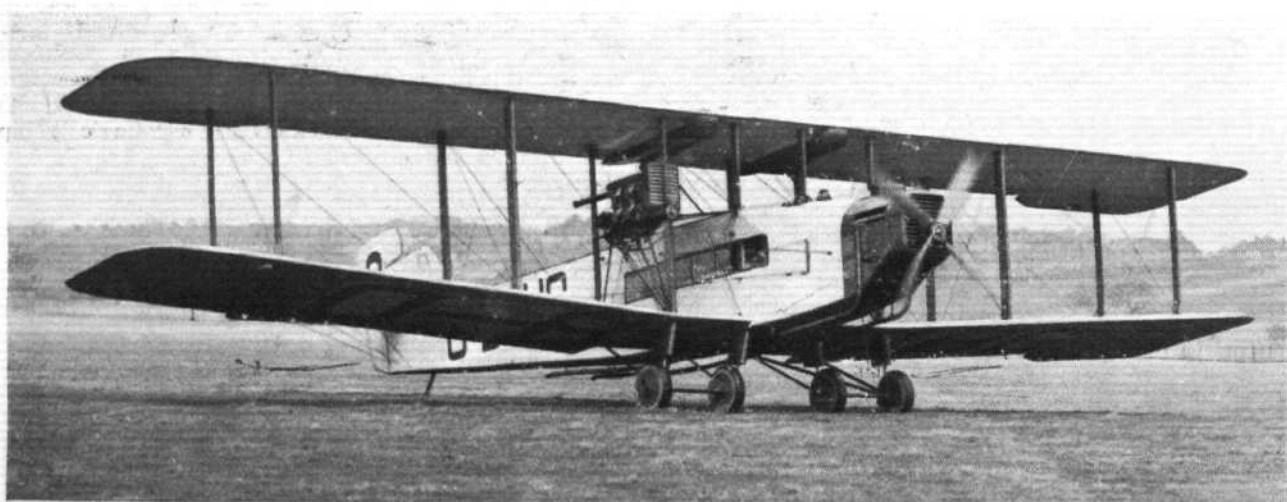
THE VICKERS "VIMY COMMERCIAL": A commercial version of the "Vimy" bomber, with two Napier "Lions," originally operated by Instone Air Line Ltd., since 1920. (FLIGHT Photo.)



THE D.H. 34: A single-engined (Napier "Lion") high performance machine previously employed on Instone Air Lines and Daimler Hire, Ltd. (FLIGHT Photo.)



VARIETY IN TYPES: The Supermarine "Sea Eagle" flying-boat; the D.H.50 "Taxi"; and the Bristol 10-seater.



THE HANDLEY-PAGE W.8F. "HAMILTON": The first 3-engined machine to be used by Imperial Airways. It had a central Rolls-Royce "Eagle" engine and two Siddeley "Puma" wing engines. (FLIGHT Photo.)



THE HANDLEY-PAGE W.9 "HAMPSTEAD": This was an improved version of the "Hamilton," and had three 385 h.p. "Jaguars." (FLIGHT Photo.)

time. One of these machines, G-EBBI "Prince Henry," is still in operation, although it is not used on the cross-Channel services.

The De Havilland 34's of the Instone Air Line, Ltd., and Daimler Hire, Ltd., had a single 450-h.p. Napier "Lion" motor, carried 11 persons at a maximum speed of 115 m.p.h., thus being faster than many of the machines used by Imperial Airways to-day. These aircraft had been in use for nearly two years. The Vickers "Vimy Commercial," also from the Instone Air Line, Ltd., was the veteran of the fleet, having been in continual operation since 1920. She had the same motors as the Handley Pages and had accommodation for 12 passengers and two crew.

The Supermarine "Sea Eagles" of the British Marine Air Navigation Co., Ltd., were single-motored flying-boats with provision for six passengers and pilot. The motive power was provided by a 360-h.p. Rolls-Royce "Eagle IX." These machines were, however, later re-fitted with a Napier "Lion" motor in place of the lower-powered Rolls-Royce.

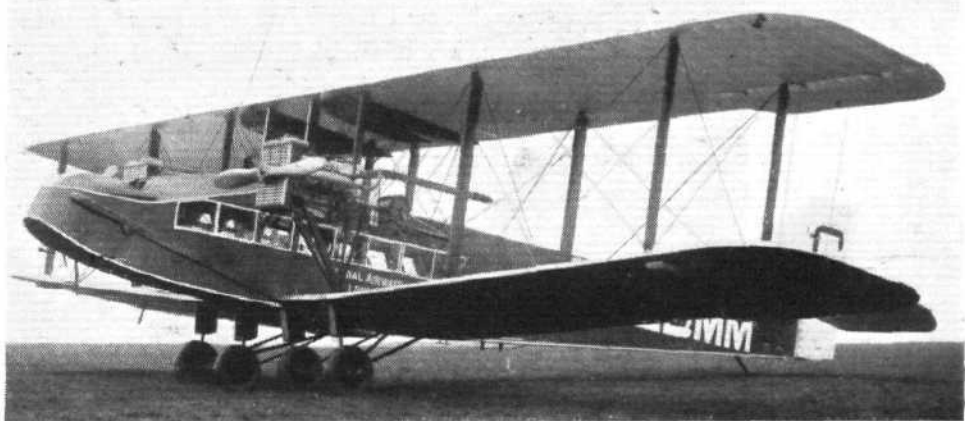
During 1924 this fleet was augmented by three new aircraft, these being G-EBFO, a De Havilland 50, shortly afterwards replaced by G-EBFP, of the same type; G-EBFC, a Vickers "Vulcan"; also G-EBIX, a Handley Page W8.F or "Hamilton."

The De Havilland 50 was a small five-seater machine with a 230-h.p. Siddeley "Puma" motor and a top speed of 115 m.p.h. Aircraft G-EBFP is still used regularly by Imperial Airways on their Special Charter service. The Vickers "Vulcan" was fitted with a Napier "Lion" motor and carried seven persons at 110 m.p.h., whilst the Handley Page W8.F was a tri-motored machine and the first of such type to be operated for civil purposes in this country. A development of the earlier twin-motored W8.B model, the motive power was provided by a Rolls-Royce "Eagle IX" in the nose and a Siddeley "Puma" on each side between the wings. Twelve passengers and two crew were carried at a top speed of 102 m.p.h.

Also, during the same year, the Bristol 10-seater, Bristol



THE VICKERS "VULCAN": One of the 1924 additions to the Imperial Airways fleet. It had a Napier "Lion" and carried seven passengers. (FLIGHT Photo.)



THE HANDLEY PAGE W.10: This was a 1926, an improved model of the original W.8B. The engines, however, were Napier "Lions." (FLIGHT Photo.)

"Jupiter" motor, G-EBEV, was operated on the Cologne route as a freighter for commercial test purposes, having been loaned by the Air Ministry.

Three aircraft were, however, written off the assets during the same period, these being G-EBBR, destroyed by fire at Ostend; G-EBBX, lost in an accident at Purley and G-EBCX withdrawn from service.

During 1925 additions to the fleet were as follow:— G-EBLB, a Vickers "Vulcan"; G-EBKZ, a D.H. 50a; also G-EBLE, the Handley Page W9 or "Hampstead"



THE ARMSTRONG-WHITWORTH "ARGOSY": Another 1926 machine—a marked advance in airliner design—fitted with three Armstrong-Siddeley "Jaguars." (FLIGHT Photo.)

with triple 385-h.p. Armstrong-Siddeley "Jaguar IV" motors, a top speed of 117 m.p.h. and accommodation for 16 persons. The Avro "Andover," G-EBKW, fitted with a single 650-h.p. Rolls-Royce "Condor IIIa," was temporarily operated by Imperial Airways, having been lent to them by the Air Ministry for testing-out on the Continental air lines in the same manner as, the previous year, the Bristol 10-seater had been. The hardy old "Vimy" and the "Vulcan," G-EBFC, were withdrawn from service during the year.

The year 1926 saw the introduction of several new types; also the withdrawal from service as obsolete of the four remaining D.H. 34's which had flown for so long and so well. The loss of the "Sea Eagle," G-EBGS, at Guernsey, through being rammed by a ship whilst at moorings during the night, also occurred during the same year.

The first new type was the Handley Page W10, which was similar in all essentials to the original W8 produced

in 1919. The motors were two Napier "Lions." The seating capacity was 14, the same as the W8.B's, and the top speed was 112 m.p.h. Four machines of this type were delivered—G-EBMM *City of Melbourne*, G-EBMR *City of Pretoria*, G-EBMS *City of London* (which was lost in the Channel during October of the same year), also G-EBMT *City of Ottawa*. At this time Imperial Airways commenced the practice of naming their larger aircraft, the W8.F being *City of Washington* and the W9 *City of New York*.

The second new type to be introduced during the year was the Armstrong-Whitworth "Argosy," with triple "Jaguar IV" motors, of which two examples were acquired—G-EBLF *City of Glasgow* and G-EBLO *City of Birmingham*. Carrying 20 passengers and two crew, these aircraft were the largest in the world to be operated on regular air routes, and, with a top speed of about 110 m.p.h., they were a considerable advance on any machines hitherto operated.

(To be concluded.)



PEDIGREE FORDS: Prize sheep from the flock of Mr. John Langmead, of Ford, Sussex, under the wing of one of the Ford monoplanes.

Canadian Air Mail Services Cut

ALTHOUGH it was reported that Canadian air mail services were being curtailed for reasons of economy, negotiations between officials of the Post Office Department, Department of National Defence and Prime Minister R. B. Bennett have resulted in the cancellation of relatively few lines. Representatives of airway operating companies have not failed to emphasise the importance of maintaining trunk lines and the personnel of organisations developed over a term of years. Complete cancellation, they maintained, would entail considerable difficulty in reviving the service. As a result, the Premier has consented to a continuation of those routes deemed highly advisable, but insisted that those lines on which little traffic has developed shall be cancelled. Services east of Toronto and between Montreal and the Maritime districts will be discontinued, the mail between Toronto and Montreal being carried by train; another suspension is the Regina, Moose Jaw, Medicine Hat, Saskatoon, North Battleford and Edmonton service. As a compensation for the dropping of the western subsidiary line, the main trunk air route, Winnipeg-Regina-Moose Jaw-Lethbridge and Calgary, has been extended to Edmonton.

A New Ford "Pullman"

THE most luxurious *de luxe* three-engined Pullman plane yet built by the Ford Motor Company has been on view at the Ford Aerodrome, Arundel, Sussex, and is now ready for demonstration by pilots of Ford Motor Co., Ltd., in Great Britain and on the Continent. The Pullman interior of the plane is finished in rich browns, greens and tans, the lower wall panels being of oriental walnut, with a decorative frieze of hunting scenes against a tan-coloured background. Walnut panels between the windows are set off with a riding crop and horn against a similar background, while the relief panels on either side of the forward wall of the passenger compartment are finished in rare woods. The rug of walnut brown and the window curtains of ecru harmonise with the other fittings. The six club-type reclining chairs and a divan accommodating three

persons are upholstered in dark green colonial grain leather. Lamps shaded with crystal glass light the cabin for reading, one lamp being fitted above each seat. Other interior fittings include an electric fan and a cupboard built into the forward wall of the luggage compartment which is located just to the rear of the passenger compartment. A lavatory, fully equipped, is reached by a door opening out of the cabin, adjoining the luggage space. The plane is of the high-speed type, with high wing, which allows full head room throughout the cabin. Each of the three "Wasp" engines is fitted with an electric inertia starter. Other equipment includes an aperiodic compass. Compartments are installed in the wings for carrying 1,600 pounds of luggage. The plane has large auxiliary petrol tanks to permit long aerial tours.

A New Washington-New York Service

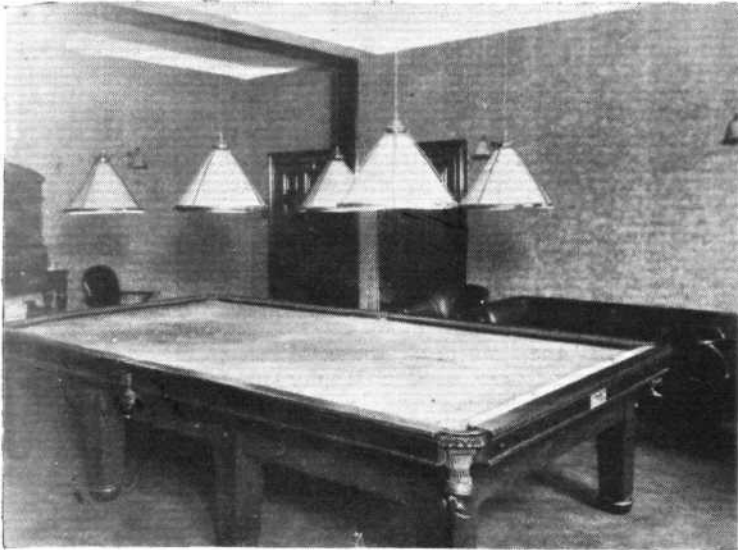
A HIGH-SPEED *de luxe* airline service between New York, Philadelphia and Washington was opened on September 16 at Washington-Hoover Airport by the Ludington Lines, when the first of their new Lockheed "Orion" transport planes inaugurated a 68-minute service between Washington and New York.

The machine, a seven-passenger low-wing monoplane, with retractable landing gear, and capable of a top speed of over 200 miles per hour, will, it is claimed, maintain the fastest airline schedule in the world. Four round trips each way daily are scheduled.

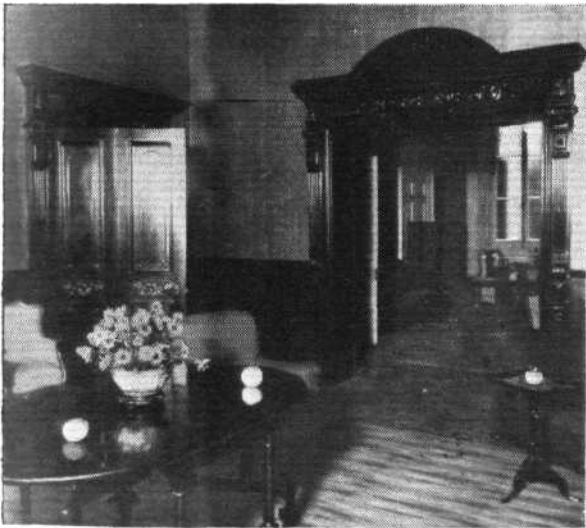
Air Mail to Dutch East Indies

THE Postmaster-General announces that on and from September 30 the air mail service from London to the Dutch East Indies will be operated weekly, instead of fortnightly as hitherto. The latest time of posting at the General Post Office, London, will be 10.30 a.m. every Wednesday. The combined rate of air fee and postage will be as follows:—To Siam, Straits Settlements and Malay States, 1s. per $\frac{1}{2}$ oz.; to the Dutch East Indies, 1s. 1d. per $\frac{1}{2}$ oz. The time of transmission from London to Bangkok and Medan will be about 10 days, and to Batavia and Singapore about 11 days.

The New Home of the Royal Aero Club



In the photograph above is seen the Reception Hall. On the left, a corner of the Billiard Room. Below, the Lounge. (FLIGHT Photos.)



A corner of the Ladies' Room.



Above, the Writing Room, and, on the left, the Dining Room.

Airisms from the Four Winds

Kingsford Smith's Hustle

AIR COM. KINGSFORD SMITH left Wyndham, West Australia, in his Avro Avian, *Miss Southern Cross*, on September 24 for his attempt to beat Mollison's record for a flight from Australia to England. After a flight of 16½ hr. he landed at Cheribon, Java, whence he proceeded at 3.45 a.m. next morning for Victoria Point, where he arrived at 7.15 a.m., September 26. After only four hours' rest he left again for Rangoon, which was reached in the evening, but was off again in the early hours of September 27. He passed over Allahabad in the afternoon, having made a short stop at Calcutta for some brandy, as he experienced a slight attack of sun-stroke, and arrived at Jhansi in the evening. Karachi was reached on the morning of September 28, and after a short rest Kingsford Smith pushed on to Bushire, whence he continued almost immediately for Aleppo. Oil trouble, however, forced him to return, and he did not get away again until late next morning. Fighting against blinding sandstorms he reached Baghdad, and after refuelling pushed on to Aleppo, where he arrived at 11 p.m., September 29—on the sixth day of his flight. Mollison reached Aleppo on his seventh day, so Kingsford Smith was thus ahead, and at the time of writing we learn that he left Aleppo at 4 p.m., September 30, for Rome, thus giving him a fair chance of beating the record, if only by a small margin.

"Graf Zeppelin" Home Again.

THE German airship *Graf Zeppelin*, which recently completed its third trip to Brazil, has successfully completed its return journey. The airship left Pernambuco on September 26, and, passing over Gibraltar in the evening of September 27, arrived back at Friedrichshafen on September 28.

The "Akron" Makes its Maiden Flight

THE U.S. airship *Akron*, recently completed by the Goodyear Co. for the U.S. Navy, left Akron, Ohio, on September 23 on its maiden flight. With about 112 persons on board, including Mr. Adams, Secretary of the Navy, the airship accomplished a flight of nearly four hours, during which she cruised over a distance of about 125 miles. The landing, assisted by a party of about 250 strong, was successfully effected after dark by the aid of floodlights. It is reported that the Navy Department is preparing for the construction of an airship twice the size of the *Akron*, and is also considering the question of purchasing the R.100 for use as a training ship.

A Paris-Madagascar Flight

A FLIGHT to Madagascar via the East Coast of Africa was begun at midnight on September 27 by the French airmen Goulette and Salel, who reached Tunis at 9.15 a.m., and left again for Benghazi.

Funeral of Le Brix and Mesmin

THE funeral of Le Brix and Mesmin, the two French airmen who were killed in the crash of the *Hyphen II* near the Ural Mountains, took place at Notre Dame on September 27. Cardinal Verdier sang Mass and delivered an address, and speeches were made later by the Minister of Air and others.

Six Miles Upside Down

ON September 27, F/O Bullmore, piloting an Avro biplane, flew upside down from Burntisland, on the Fife coast, across the Firth of Forth to Granton, Edinburgh, covering a distance of 6 miles in 4½ minutes.

Lord Wakefield and Mr. Kaye Don

ON Tuesday, September 29, Lord Wakefield entertained a large company at the Connaught Rooms, Great Queen Street, to a luncheon in honour of Mr. Kaye Don on his return from America after establishing a lap record of 93.017 m.p.h. on the five nautical mile circuit at Detroit. Among those present were Fld. Marshal Sir Wm. Robertson, Sir H. Royce, the Master of Sempill, Sir Malcolm Campbell, Sir Alan Cobham, Mr. C. Grahame-White, Earl Howe, Mr. J. A. Mollison, and Sir Alliott V. Roe. Proposing the health of Mr. Kaye Don, Lord Wakefield recalled that at Lake Garda he travelled faster on water than any man had ever travelled before, 110 m.p.h., and that in the first race, which he won at Detroit on

September 6, he created a new lap record of over 93 m.p.h., while his average speed for that most difficult course was over 89 m.p.h. The previous lap record was 77. Lord Wakefield added a tribute to the firm of Rolls-Royce for having produced such epoch-making engines, to Mr. Fred Cooper, the designer, and the firm of Saunders-Roe, who built the boat *Miss England*. In his reply, Mr. K. Don first paid a handsome tribute to his magnificent mechanics. He said that the Rolls-Royce engines ran magnificently, and did their bit for the honour of the Old Country. Behind all was the guiding inspiration of Lord Wakefield, whose cable messages to him at difficult moments had meant more even than his generosity in financing the venture. He said that the citizens of Detroit were presenting a trophy to Lord Wakefield in recognition of his sporting behaviour. As for himself, he said that he only did his bit for England.

Do.X in Trouble

THE confiscation of Germany's giant flying boat, the Do.X, is demanded in a law-suit which opened before the Federal Court at New York on September 25. The plaintiffs, Messrs. Isaac Schafram and Jacob Thaler, allege that patents held by them have been infringed by the owners, operators, and builders of the flying-boat.

Prof. Piccard's Postponed Lecture

PROFESSOR PICCARD having found it impossible to make arrangements for himself and his assistant, Herr Kipfer, to visit England on October 8, 1931, the lecture before the R.Ae. Society for that date is unavoidably postponed.

British Aircraft for Egypt

A CONTRACT of a total value of £7,000 has been secured by the de Havilland Aircraft Company, Limited, for the supply to the Egyptian Government of "Moth" military training and light offensive aircraft. Although essentially of the economical light aircraft class, with 120 h.p. Gipsy II engines, the equipment of these machines is extremely complete, resulting in ready adaptability to many varied duties. For flying training pure and simple, full dual control is provided and, by duplication of all instruments, the machines can be flown from either of the two cockpits. For reconnaissance duties a Service type aerial camera is fitted in the floor of the front cockpit, and the rear cockpit contains full wireless transmitting and receiving gear, with trailing aerial let-out and retracted by a small winch. For offensive purposes four 20-lb. bombs are carried in a rack beneath the steel fuselage. With an extra 10-gallon petrol tank, each machine has a range of some 500 miles without refuelling, at a cruising speed of 90 m.p.h. Further equipment is represented by Handley Page automatic wing-slots, a 2-gallon drinking water tank, air-tight ration boxes, a Very pyrotechnic pistol and cartridges and a fire extinguisher. This fleet of military "Moths" is expected to be ready for delivery at the end of October when, in all probability, the machines will be flown out from Stag Lane Aerodrome to Cairo by Officers and sergeant-pilots of the Royal Air Force.

"And So Say All of Us"

SUPERMARINE AVIATION WORKS (VICKERS), LTD., and ROLLS-ROYCE, LTD., have received the following letter from the Air Ministry which also, we feel certain, reflects the sentiments of all our British readers—

"On the conclusion of the last of the contests for the Schneider Trophy, resulting in its permanent retention in this country, I am commanded by the Air Council to convey to you and your workmen, and the other firms associated with you, their high appreciation of the skill and unremitting effort by which this international distinction has been secured for British aeronautics. In spite of the short time available for preparations this year, the remarkable progress in performance which has been the signal feature of these contests has been admirably maintained, and the Council desire to record their satisfaction at this noteworthy achievement, in which Vickers Supermarine Rolls-Royce seaplanes have conspicuously vindicated the claim of British engineers, as of British pilots, to supremacy in the art of high-speed flight.

(Sgd.) C. LL. BULLOCK."

The ROLLS-ROYCE Racing Engines

IT is with the very greatest pleasure that we are able to publish this week, by the courtesy of Rolls-Royce, Ltd., and the Air Ministry, something of the history of the very wonderful racing engines produced by the Rolls-Royce firm for the Schneider Trophy seaplanes built by the Supermarine Aviation Works. We believe we are correct in stating that never before in the recent history of flying has an engine firm divulged so much information so soon after the event for which its special engines were designed, and the "story" is interesting reading indeed. The manner in which the Rolls-Royce firm has, during the last few years, advanced its aero engine work to a leading position is probably without parallel in the annals of flying, and the following notes on the "R" engines produced for the Schneider machines will, in addition to their main theme, throw a considerable light on the reasons for the present position of the Rolls-Royce Company in the very forefront of the world's aero engine manufacture.

Of the water-cooled, twelve-cylinder vee type, the Rolls-Royce "R" engine has been developed from the "Buzzard" (formerly known as the "H" type) of 825 b.h.p. The bore and stroke of the "R" engine are the same as those of the "Buzzard," namely, 6 in. by 6.6 in. (152.5 mm. by 169 mm.), and the basis of the design is fundamentally the same in both types. This is partly due to the fact that neither in 1929 nor in 1931 was there sufficient time to undertake radically different forms of design and methods of construction.

Generally speaking, the features which have enabled the power of the "R" engines to be increased so far beyond that of the "Buzzard" are: the new type supercharger, a much higher compression ratio and higher operating speeds.

The most apparent difference between the racing engine and the standard one lies in the superchargers. This is necessitated by the enormous bulk of air drawn in by the racing superchargers. To avoid a unit of very large diameter, air is taken into the rotor at both sides. The position of the air intake in the racing aeroplanes has been located in the vee of the engine, to avoid the ingress of spray, and necessitating the sheet metal air channel at the back of the engine. This channel is utilised initially to compress the air a little, before it reaches the carburettor, and is slowed down by the divergence of the channel before entering the carburettor. The reduction in kinetic energy produces a gain in pressure energy. This type of intake, a Rolls-Royce patent, is now in use on many Service machines.

The propeller reduction gear, of the straight spur type, is modified from the standard unit to conform with the machine builder's requirements as to the shape of the nose. The camshaft and rocker covers are modified for fairing purposes. Beneath the engine the auxiliaries are raised a little on the racing engines to reduce the depth of fuselage required.

The 1929 race engine gave 1,900 b.h.p. at 2,900 r.p.m.

and weighed 1,530 lb. The 1931 engine gives 2,300 b.h.p. at 3,200 r.p.m. and weighs 1,630 lb. The power increase this year is 21 per cent. for a weight increase of $6\frac{1}{2}$ per cent.

To obtain the 1931 performance it was decided to increase the engine speed, the supercharger gear ratio and the size of the air intake. The approximate power and speed were decided upon before commencing the development work to attain this performance combined with the necessary degree of reliability.

The decision that Great Britain should compete was made at the end of January, 1931, and experiments were immediately commenced on the remaining 1929 race engines, while new designs of strengthened parts were being prepared. The specification of the race engines was not finally settled till about three weeks before the race, however.

During experimental work on these engines, numerous difficulties have had to be met and overcome. These will be described before proceeding to detail some of the engine problems.

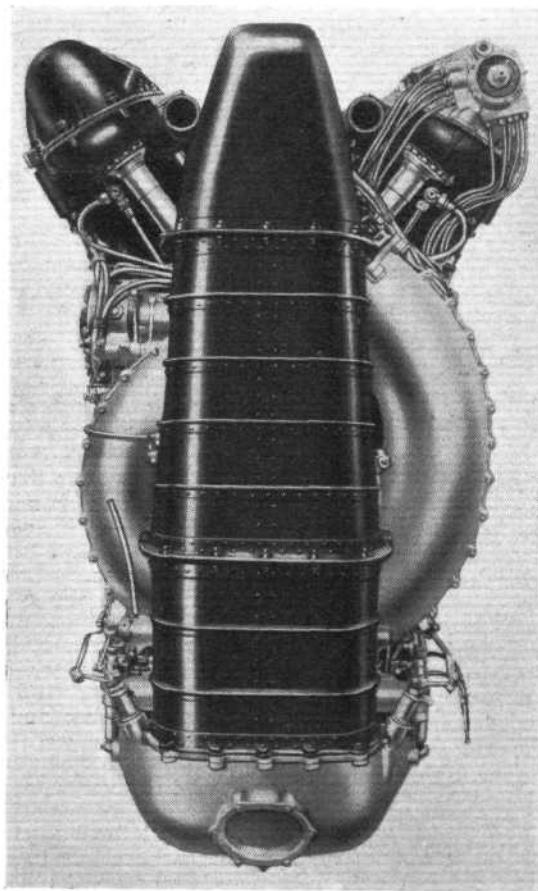
Heenan and Froude produced a special water-brake which gave very satisfactory results.

It was designed to reduce blade-erosion trouble and boiling of the water in the brake; it was also independent of the pressure of the water supply, and thus did not suffer from sudden uncontrollable variations of load.

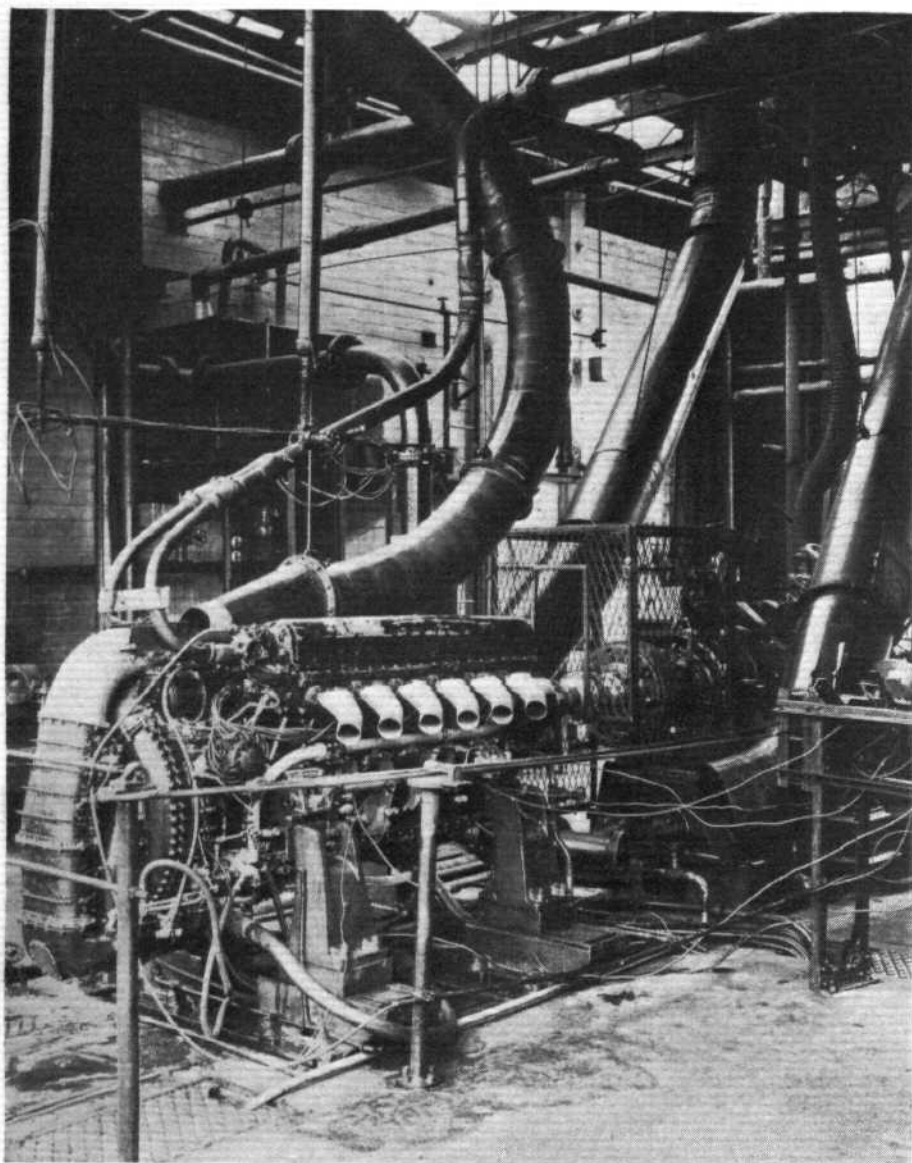
Trouble was experienced with getting the exhaust gases out of the test house, particularly with the wind in certain quarters. The intake air temperature was sometimes raised 10 deg. C. or so by exhaust gas dilution, which affected the power output by as much as a hundred horse-power. The testers also experienced unpleasant effects. The trouble was overcome by fitting up a "Kestrel" engine on a test stand outside the "R" engine test house, with a pusher propeller directing a stream of air right through the test house. This equipment is shown in a photograph. Two large electrically-driven fans were mounted in the roof, for blowing cooling air over the crankcase. Small air-streams were also led over the exhaust plugs, as these were situated very near the stub exhaust pipes used on the test bed.

In order to reproduce the machine conditions of air flow into the air intake of the engine, a special fan was installed to produce a 400-m.p.h. blast out of a nozzle mounted in front of the intake, as shown in one of the photographs. The Pitot heads are shown with which the air speed was determined. This fan ran at over 3,000 r.p.m. and required another "Kestrel" engine to drive it.

A single cylinder unit was also designed and built for fuel and plug tests, complete with a blower plant, etc., but proved very unreliable mechanically. It gave far more trouble than the same parts in the complete engine. Another rig made was a supercharger test rig for supercharger development. As this took between two and three hundred horse-power to drive it, a further "Kestrel" engine was required. This also is shown in an illustration.



REAR VIEW OF THE "R" ENGINE:
The supercharger draws air through the long air intake between the cylinder banks.



ON THE TEST BENCH: One of the "R" engines in the special engine test house at Derby.

"R" Engine Development

As might be expected, a large number of engine problems had to be solved before the required power output and standard of reliability were attained. It was decided that a one-hour run at full power was to be the first milestone that had to be passed, before the engines could be delivered as airworthy. By the end of April, the experimental engines would usually last about 20 min. before some kind of failure. By the middle of July they would still only do about half an hour non-stop. On August 3 a run of 58 min. was done at 2,360 b.h.p. and the hour non-stop was finally accomplished on August 12, at 2,350 b.h.p.

As part of the re-designing of the engine, an entirely new type of connecting rod was designed and developed, and very considerable modifications were effected in the crankshaft and crankcase, to withstand the terrific loads. Some idea of the magnitude of the crankchamber stresses may be gained from the fact that the load on the centre main bearing due to centrifugal and inertia forces was no less than nine tons.

Alternative bearing metals were tried, but white metal was finally made to stand up. An obscure trouble experienced at one time was side-lashing of the big-end bearings against the webs, which caused failure of the white metal on either side of the big ends.

Considerable trouble occurred with valve springs. Rather more so than was expected, considering that the speed was only raised 300 r.p.m. In fact, at one time two or three would be found broken after a ten-minute run. Extensive tests were done on a valve spring rig consisting of one cylinder block, and all aspects of design and material were thoroughly gone over. The final springs arrived at were

somewhat reactionary, but no further failures at all were experienced on the engines after fitting them.

The oil consumption rose to terrific figures at the 1931 speeds and powers, partly owing to great quantities lost through the breathers. On one 25-min. run the oil consumption was at the rate of 112 gallons an hour; the test house was a sight after it! By weeks of work on combinations of scraper rings and crankcase breathers, by modification of the scavenging system, and by the final adoption of a deeper sump which filled all the available space in the machine, the consumption was reduced to about 14 gallons an hour for the final race engines. It also effected a considerable reduction in the oil temperature rise through the engine; oil entered the engine at about 80 deg. C. and came out at about 140 deg. C. The oil used was pure castor.

The fuel to be used was the subject of many tests; a compromise had to be effected between power and specific consumption. In the experiments on fuels very valuable assistance was rendered by the Ethyl Export Corporation.

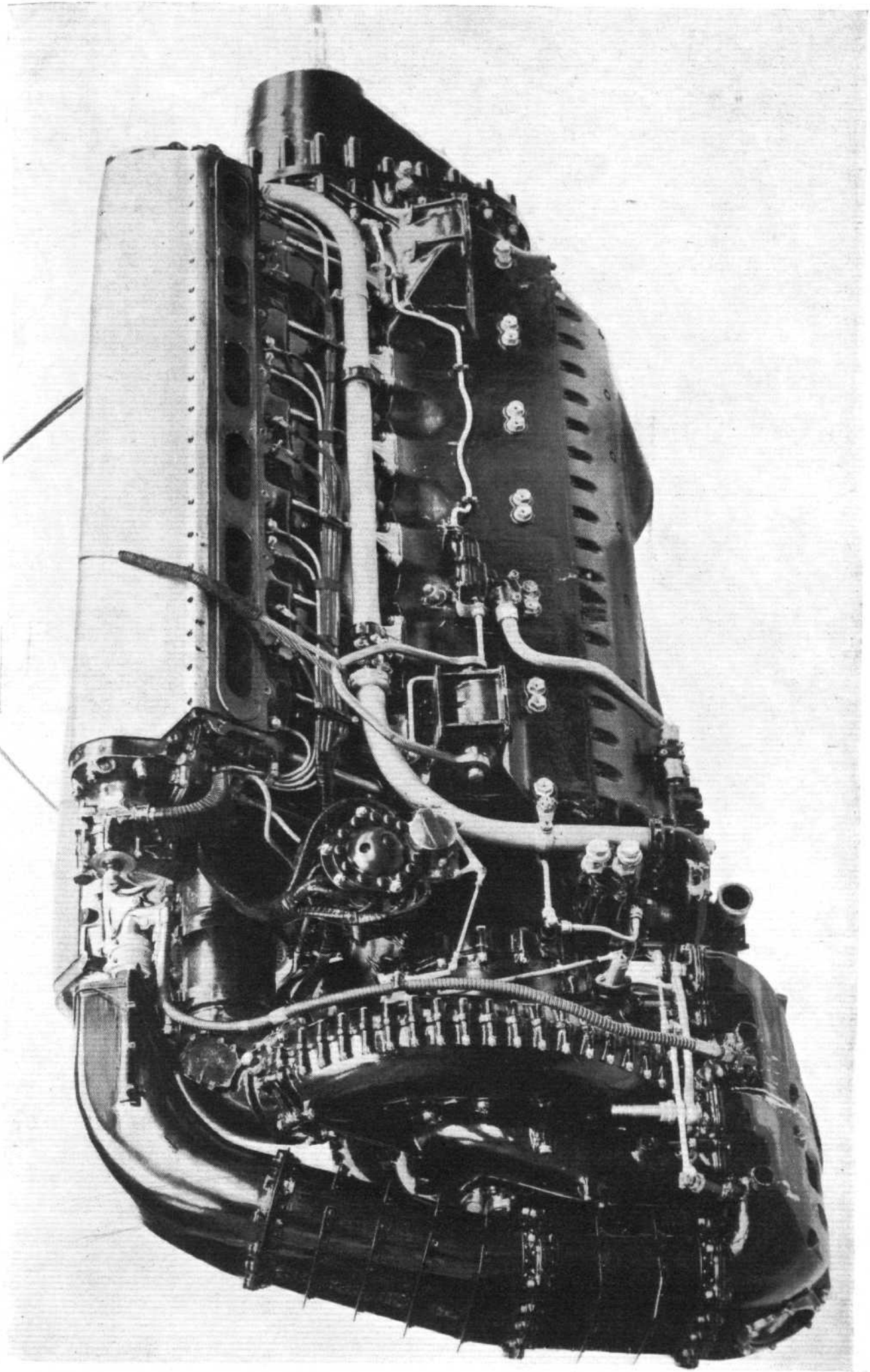
The plugs used in both 1929 and 1931 were Lodge, type X170, which gave very little trouble indeed, in spite of the increased boost and power, and weaker mixture. During the course of development it was found that a run on the engine was a more severe test for insulation, etc., than anything the makers could impose. It was decided to give all plugs an endurance test in an engine before sending them to Calshot. After this run they were returned to the Lodge firm, who examined the inners, re-polished them and fitted new outer bodies, before sending them off to Calshot. A few doubtful cases were found in this way, which might have caused trouble in the machine. Actually, no plug troubles of any description were experienced in the machines. The same plugs could be used for warming up and taxiing about as for the full throttle flying. It is of interest to note

that of the plugs that did fail on the test-bed, the majority when examined microscopically were found to contain small metallic inclusions, presumably out of the engine.

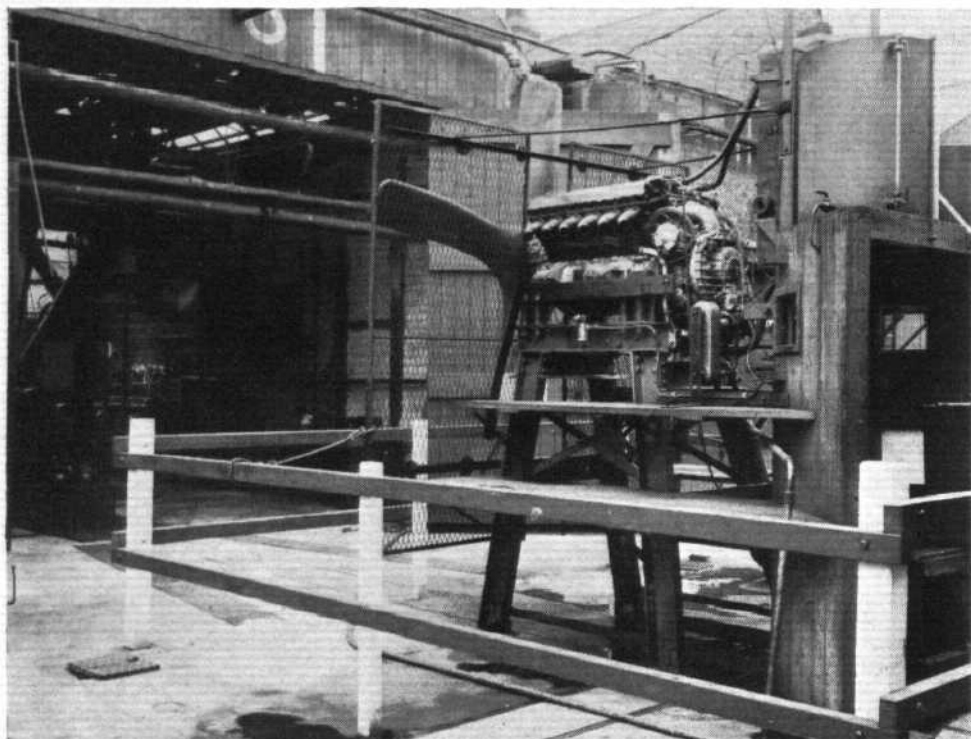
Both B.T.H. and Watford magnetos were used on the race engines. Some trouble was experienced with magnetos on the test-bed, due to the vibration to which they were subjected. Every nut on the magnetos had to be split-pinned, and certain parts had to be stiffened up. The magnetos are spigot-mounted, and in several cases engine oil worked its way right along the rotor into the contact breaker and caused pitting of the points.

All engines were tested on a hangar with a propeller fitted before going away, for opening and for tick-over. The tick-over speed was set at 475 r.p.m., and the engines were remarkable as racing engines for their tick-over and flexibility. Considerable trouble was taken with the carburettors to reduce flooding and piling up troubles and improve the handling in the air. Gas starters were also tested on the hangar. When in the machine the only method of starting is by compressed air or with the "Bristol" gas starter. Mixture distributors were provided on the engines for this purpose.

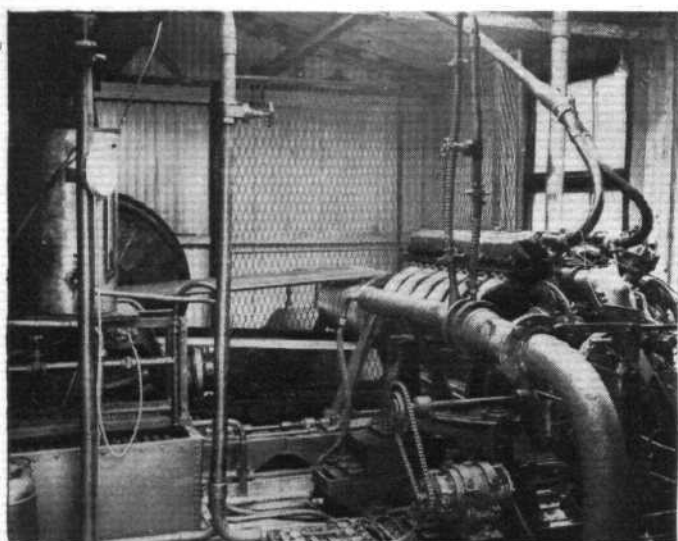
Hiduminium alloys (R.R.50 series) were used for all aluminium parts. The life of these engines being short, forged aluminium was used to replace bronze and steel in many parts of the engine. Much valuable experience was gained with stronger materials for such parts as connecting rods. From the experience gained from many smashed-up engines, a "Life of Parts" list was drawn up, and pieces were thrown away after their allotted span, whether broken or not. This was found to be cheaper and quicker than re-building smashed engines. There is hardly a single component part in the engine which has not received design attention and been improved in



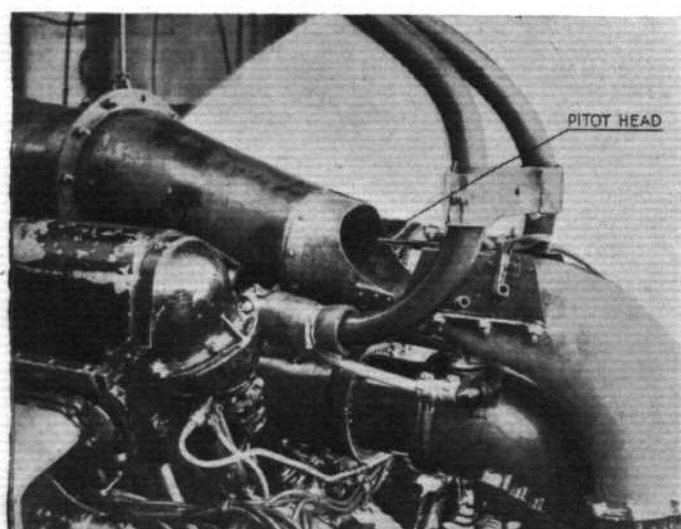
2,300 B.H.P. AT 3,200 R.P.M.: Three-quarter rear view of the Rolls-Royce 1931 "R" engine. The velocity of the air through the intake is about 400 m.p.h. The weight of the engine is 1,630 lb., or less than $\frac{1}{4}$ -pound per horse-power.



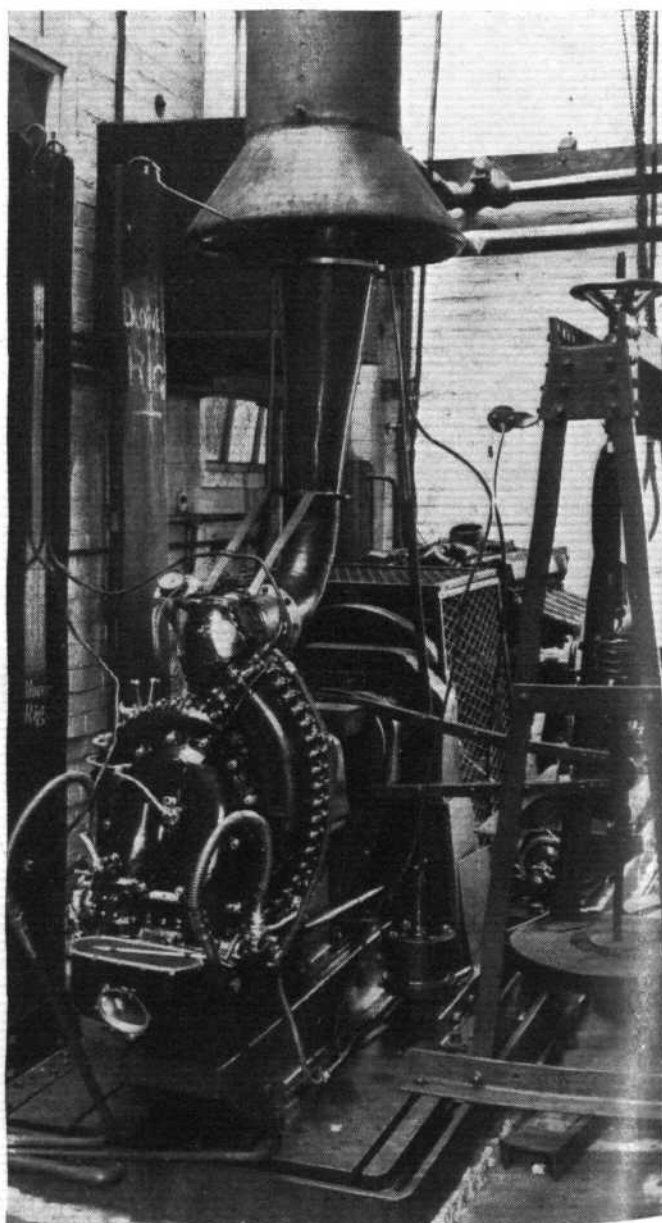
VENTILATION: During the tests of the "R" engine a "Kestrel" driving a pusher airscrew was used for blowing a stream of air through the test house.



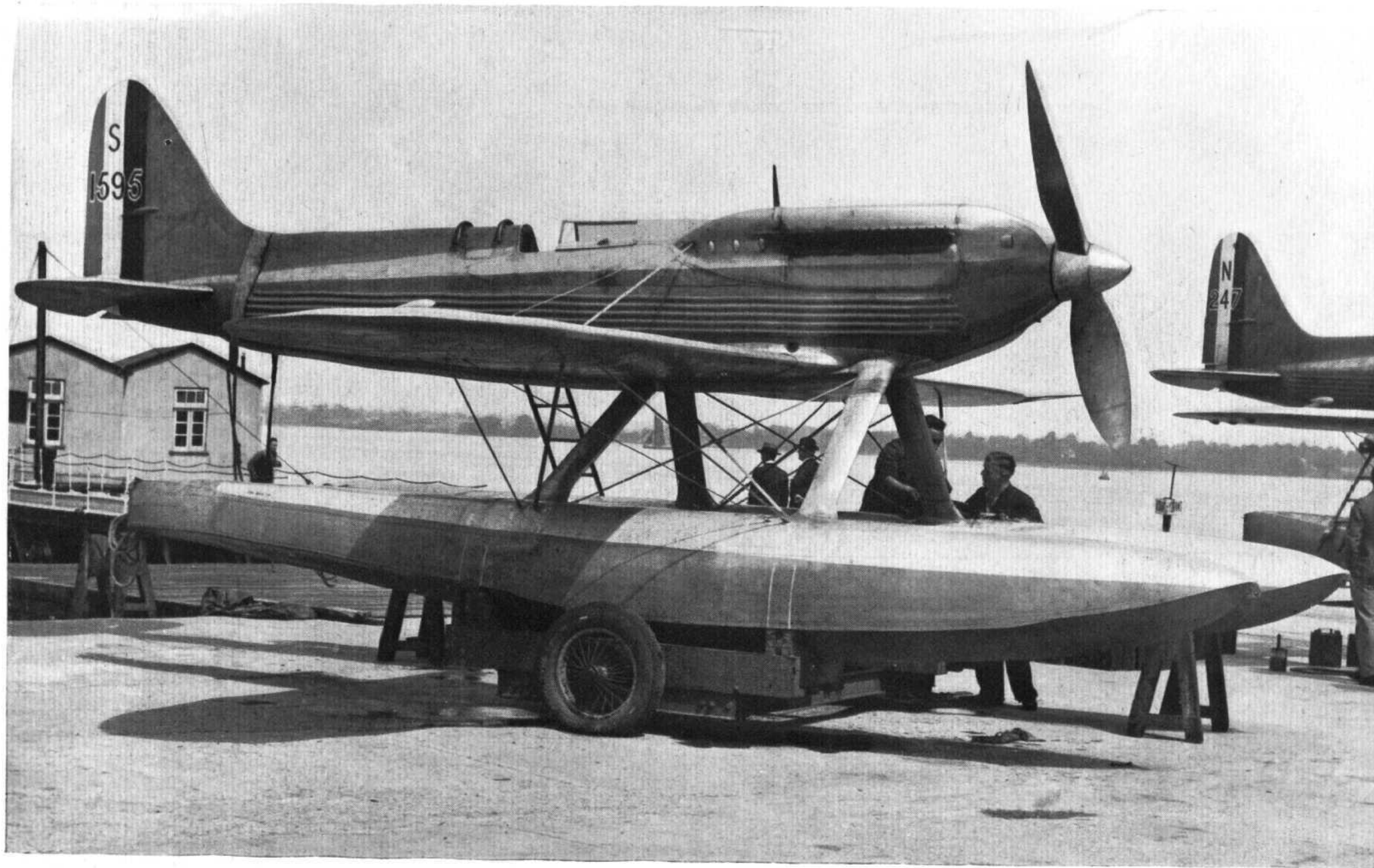
A "KESTREL" TO THE RESCUE: The fan which gave an airspeed over the air intake representative of actual flying conditions was driven by a "Kestrel" engine.



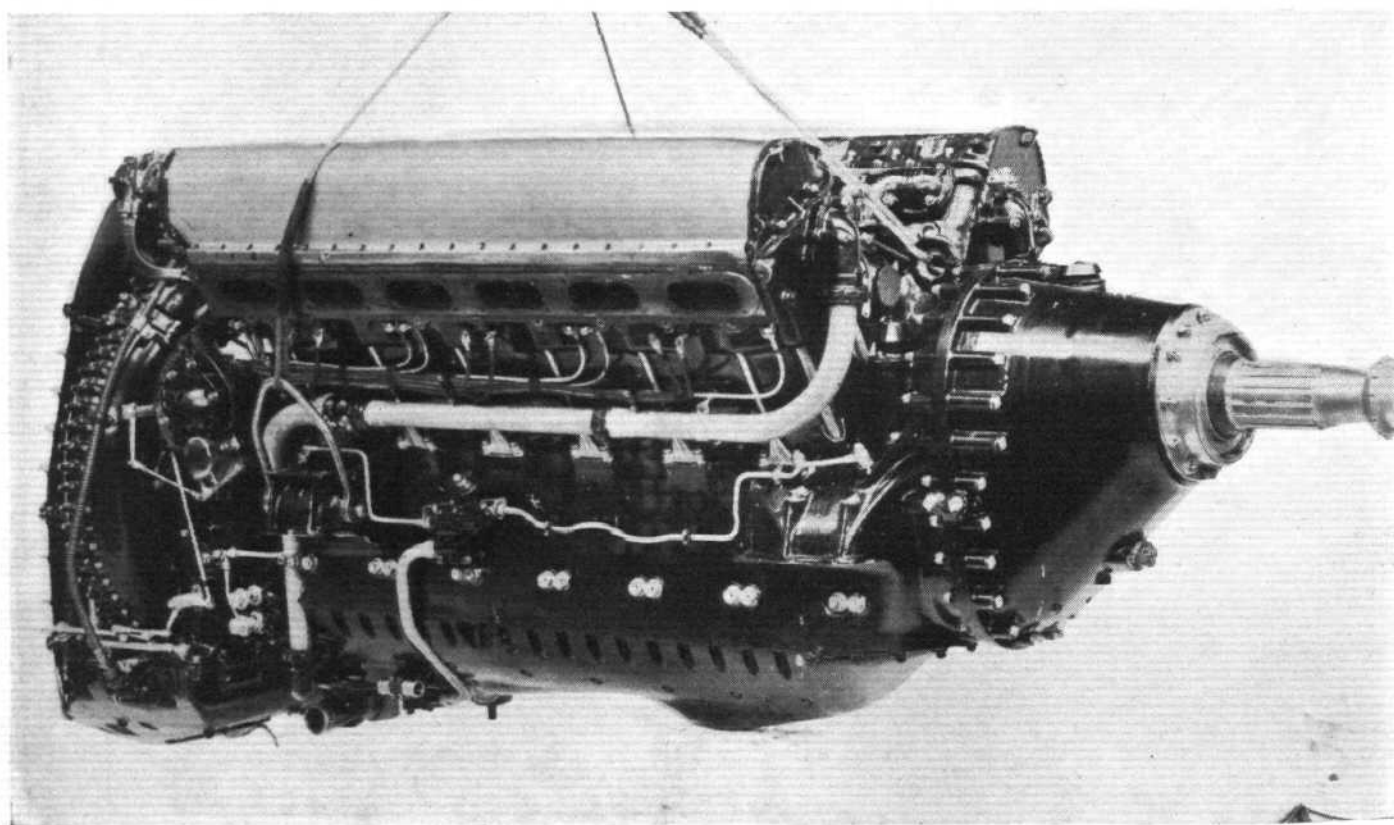
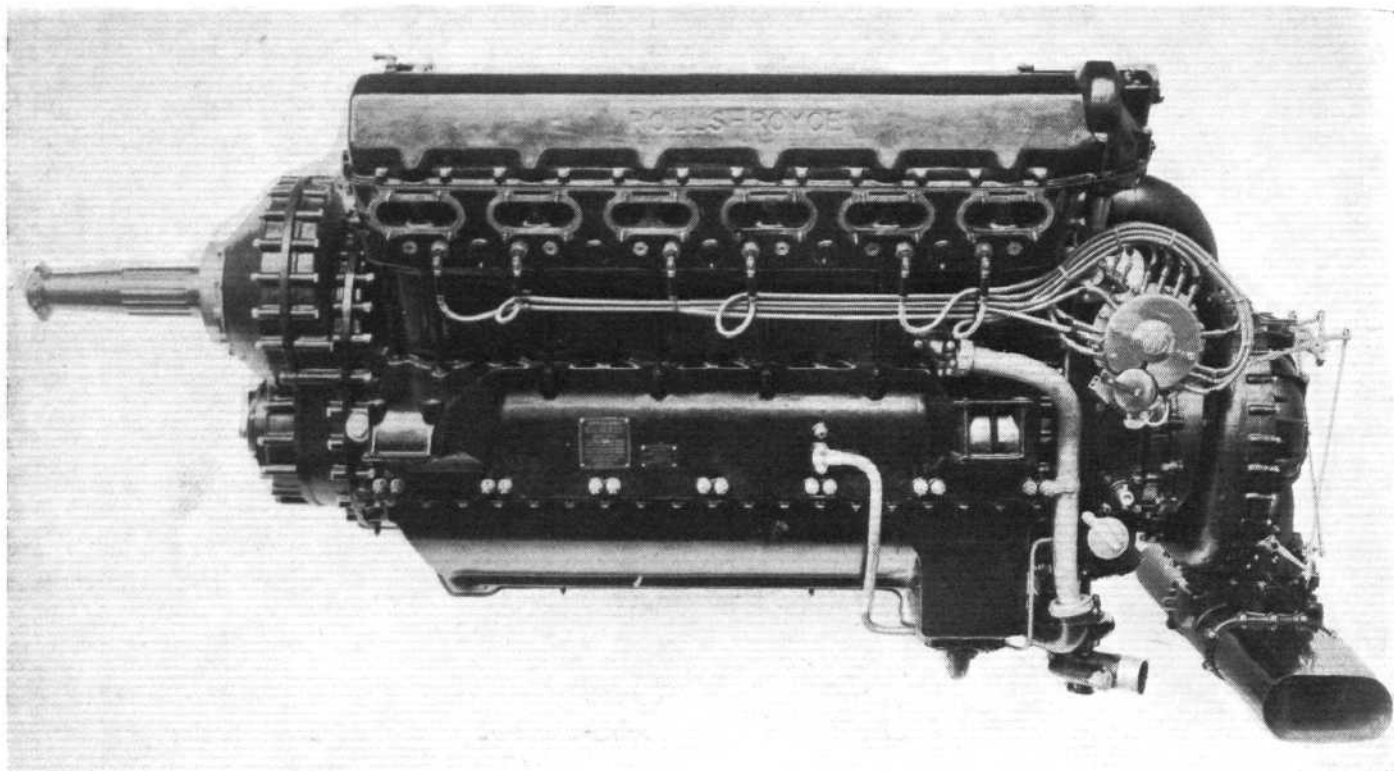
DELIVERING AIR TO THE AIR INTAKE: A special fan produced a 400 m.p.h. blast from a nozzle mounted in front of the air intake. A pitot tube was used for measuring the air velocity.



FOR SUPERCHARGER DEVELOPMENT: A "Kestrel" was used for driving the supercharger intended for the "R" engine during the development period.



NEATLY INSTALLED: The Rolls-Royce "R" engine is housed in the Vickers-Supermarine S.6 B with a minimum loss of space, and in an extremely small frontal area. It was on this actual machine, but with a different Fairey metal airscrew, that Flt.-Lt. Stainforth established a new world's speed record of 408.8 m.p.h. (FLIGHT Photo.)



ANCESTRY: The upper photograph shows one of the Rolls-Royce "Buzzard" engines from which the racing engine was developed. The lower photograph, of the 1931 "R" engine, provides an interesting comparison.

some way, from large units like the crankcase and cylinders down to individual nuts and bolts all over the engine. It is no exaggeration to say that five years of normal development work would have been required to cover the same amount of ground.

It should not be thought that the possibilities of the engine are exhausted. Appreciably greater output than 2350 b.h.p. has been obtained from it. Attaining the required standard of reliability would only be a question

of time, as most of the known problems involved are pretty well understood.

In conclusion, examination of Flt. Lt. Boothman's race engine and Flt. Lt. Stainforth's record engine have shown them to be in absolutely perfect condition; there were no broken parts of any description, and from the excellent condition of the bearings it would appear possible to assemble these engines and do the same work over again.



Those who helped to make it possible

ALTHOUGH the bulk of the credit for securing the Schneider Trophy permanently for Great Britain must naturally go to the makers of the engines and machines, neither would have been possible of realisation without the very wonderful materials, accessories and equipment which went into machines and engines. Before these could be built, and even before they could be designed, the aircraft and engine designers had to have the knowledge, not only that they were available, but that when they were delivered to them, be they raw materials or finished articles, they would be up to the specifications that had been given them. No smallest piece of metal might be the least fraction under strength, and no instrument or accessory fail in the slightest degree. It is, therefore, fit and proper that some reference should be made here to the various British products which, when formed and assembled, gave the world that beautiful entity the Supermarine Rolls-Royce S.6B, which has raised the prestige of British aviation and engineering throughout the world.

Beginning with structural materials, Thos. Firth and John Brown, Ltd., of Sheffield, were responsible for the special alloy steels used in the reduction gears, connecting rods, camshafts and gudgeon pins of the Rolls-Royce "R" engines, as well as for the H.R. Crown steel from which the valves were made. All these are highly-stressed parts, and only the best materials were good enough for them.

The crankshafts which had to transmit the power impulses from the pistons were called upon to deal with enormous torque loads and to convert reciprocating into rotary movement at speeds as high as 3,200 r.p.m., and at a power output of 2,300 h.p. Yet minimum weight was to be aimed at. Made of English Steel Corporation high-tensile alloy steels, and forged by the English Steel Corporation, the crankshafts of the "R" engines stood up to their task manfully.

Of other metal parts used in the Rolls-Royce "R" engines it may be mentioned that the Magnesium alloy valve rocker covers and water jacket elbows were supplied by British Maxium, Ltd., while hot brass pressings were supplied by Wilcox & Lines, Ltd., and "Eatonia" bronzes by Yorkshire Engineering Supplies, Ltd. Ball and roller bearings were necessarily subjected to extremely heavy loads in an engine of such high power, running at what is a very high speed for an aero engine. The Hoffmann Manufacturing Co., Ltd., supplied the bearings for this year's machines, which was natural in view of the fact that that company had already supplied the ball and roller bearings for the 1922, 1927 and 1929 Schneider engines, and they had given every satisfaction. That they did so again this year is evident from the trouble-free running of the engines both in the Schneider Contest and in the flights over the 3 km. straight-line speed course.

With fuel being consumed at such a very high rate, and with high stresses imposed by the sharp turns at high speeds, the fuel supply becomes a very serious problem. Fuel had to be lifted, in the S.6B machines, from the floats to a pressure tank in the fuselage, and the resulting length

of fuel pipe line was necessarily long. "Petroflex" tubing supplied by Hobdell, Way & Co., Ltd., once more stood up to the work admirably, the "unbreakable" qualities claimed for it by the makers being fully realised.

While on the subject of fuel, reference should be made to the use once more of Pratt's Ethyl Petrol. It must be remembered that in racing engines such as the Rolls-Royce "R" type, a very high compression ratio is used in order to get a maximum of power out of an engine of minimum weight. Ordinary "straight" fuel would not have been usable with such high compression ratios, and detonation would have set in before the machines could get into the air. By a special mixture of fuel in which tetraethyl lead was an ingredient, the rate of combustion could be controlled, and detonation avoided. "Ethyl" has now become world-famous and quite familiar to every motorist, but never has its combustion-controlling qualities played a greater part in any success than it did in the Schneider machines.

The conditions under which a racing engine like the Rolls-Royce "R" worked in the Schneider Contest and over the

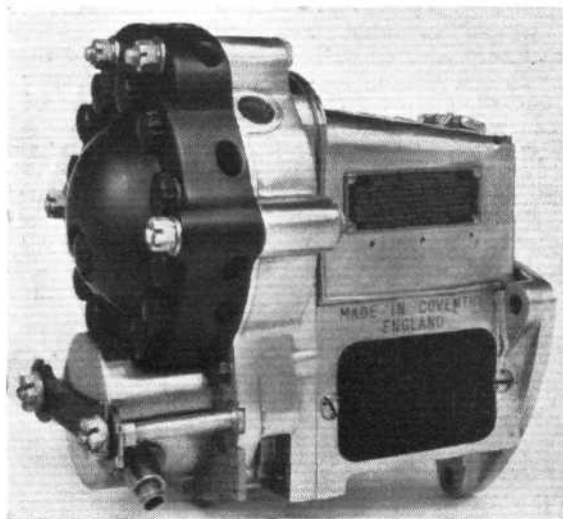
straight-line course are obviously extremely severe, and the ignition system must be up to the same high standard as the rest of the equipment. In the actual machines used, B.T.H. magnetos were fitted. These were of the SC. 12-7C.2 type, of that distinctive class of high-tension magneto known as the "polar inductor" type. This magneto is provided with a stationary armature in which the current is generated.

The two magnets are of cobalt steel, having extremely high magnetic characteristics. Before being fitted to the Rolls-Royce engines the B.T.H. magnetos were subjected to severe tests. They were run up to 7,000 r.p.m., at which speed they were producing sparks at the rate of 28,000 per min. This test was, of course, far in excess of what was actually required in the engines.

If the magnetos had a strenuous time of it, the sparking plugs had possibly an even more difficult task. The Lodge plugs, type X 170, used in the Rolls-Royce "R" engines were specially designed for the engines, but the design was based upon the normal Lodge aircraft plugs. In the notes released for publication by the Rolls-Royce firm, a high tribute is paid to the Lodge plugs, which, it is stated, gave no trouble at any time.

To design airscrews to absorb efficiently such high power as that developed by the Rolls-Royce "R" engines is a serious problem, but the Fairey Aviation Company's propeller department was equal to the task, and the Fairey metal airscrews produced a good compromise between the conflicting requirements of good efficiency at full speed and sufficient thrust at low speeds to get the aircraft over the "hump." More recently the Fairey company has produced the metal airscrew which was fitted to the specially "boosted" engine

in the S.6B on which Stainforth established a new world's speed record of 408 m.p.h. For this flight something like 2,600 h.p. was taken from the engine, and the Fairey metal airscrew designed for this flight must have absorbed a greater power than was ever before absorbed by a single airscrew.



B.T.H. Magneto, type SC.12-7C.2, as fitted in the Rolls-Royce "R" Engine.



"NO TROUBLE OF ANY KIND: One of the Lodge X 170 plugs fitted in the Rolls-Royce "R" Engines.



Airport News



CROYDON

THE week commenced with a taxiing argument between a K.L.M. "Fokker" and an incoming Air Union "Farman Goliath." The "Goliath" hit the top wing of the "Fokker" and damaged an aileron. Later, one of the wheels of another "Fokker" collapsed. The week has, therefore, started well.

It is, indeed, a great pleasure to announce that "Horsa" has arrived. He is now undergoing the strict inspection of the engineering staff of Imperial Airways. One hears little of these most competent folk—all the blame is theirs, and but very little praise—'twas ever thus with the engineering staff. Messrs. Handley Page have yet to deliver three more of the H.P.42 class.

Major Clarke and the gallant band he has enlisted to the services of Personal Flying Services, Ltd., continue to prove how the non-subsidised firms can show how to induce the would-be air traveller to fly in comfort in various types of aircraft, to anywhere, and at any time. He is at the moment of writing in Geneva. Mr. Ledlie is on a special trip to Le Touquet, and Mr. Styran is in Scotland.

The tarring process, beyond the edge of the arrival and departure area, is nearing completion, and it is to be hoped that the days of being choked by dust storms are past. Personally, I am doubtful if this defect can be remedied. The size and weight of the air liners plough up the grass. With a dry spell and a high wind, the aerodrome is simply smothered in dust.

The number of "B" licence aspirants continues to increase. Cross-country flights, right- and left-hand spins, night flights, etc., are just a few of the tests these would-be professional pilots must attempt. The examinations are considered to be fairly difficult, but how rightly so? A pilot flying fare-paying passengers should be of the very

best, and it is only just that he should be able to prove his ability and/or skill.

On Saturday last, quite a noise was heard—we believe it came from the vicinity of the old Aircraft Disposal Company's canteen. Our old friend, Mr. Shires, had been attempting to rid the canteen of rats, by means of calcium chloride. The latter won. Fortunately, Mr. Shires, the friend and adviser of all the local employees, was not hurt.

Imperial Airways G-AAXC, "Heracles" by name, made an interesting night flight on Monday last. He was piloted by Major Brackley, and made a flight over the whole of South-Eastern England, visiting all the aerodromes and night pilotage lights. After proceeding over to the French coast to Gravelines, and back via Calais and the Varne lightship, he visited Dymchurch and the newly-installed Newchurch Tower, and thence to Lympne, where we understand the night-flying arrangements were very good. Mention of Lympne reminds me that the old nautical gent is temporarily absent, suffering from some obscure malady. It is understood that Mr. J. J. Jeffs, of the Croydon Control Tower, is relieving at Lympne, ably assisted by our old friend Mr. Dupe.

It has now been decided to fly the recently approved Civil Air Ensign at Croydon in the gardens in front of the Administrative Buildings. What a party when it is unfurled! There has been plenty of joy-riding for all the firms operating on the Aerodrome. Imperial Airways had an unusually large number of parties for local flights. All these flights were carried out by Capt. Gordon P. Olley, who is the special pilot for Imperial Airways.

The traffic figures for the week were:—Passengers, 925; freight, 114 tons.

P. B.

BLACKBURN DEMONSTRATION TOUR

ON Monday, October 5, Mr. Robert Blackburn, Chairman and Managing Director of the Blackburn Aeroplane & Motor Co., Ltd., leaves Brough Aerodrome with three Blackburn machines, on a demonstration tour of Europe. He will be accompanied by Captain A. M. Blake, the firm's chief test pilot, who will pilot the Blackburn "Segrave," a four-seater cabin monoplane, Captain H. J. Andrews, who will fly solo in a Blackburn "Bluebird IV" side-by-side, two-seater light aeroplane, and another pilot in a Blackburn "Lincok" single-seater light fighter. On the outward journey to Athens, where Mr. Blackburn has appointments in connection with the Blackburn-organised Naval Aircraft Factory, the tour will pass over France, Belgium, Germany, Czechoslovakia, Austria, Hungary, and Yugo-Slavia, and demonstrations will be given at Brussels, Prague, Vienna, Buda Pest, Belgrade and Athens.

From Athens, the return journey will probably include Turkey and a demonstration at Stamboul, but, if for any reason this is omitted, the tour will return via Sofia to Bucharest, where the next demonstration takes place. From Rumania, the return route lies over Poland, Germany, Holland and France, demonstrations being given at Warsaw and Amsterdam. If the Turkish demonstration is included, the route will involve a total distance of 5,700 miles, of which approximately 1,000 miles of flying will be spent on demonstrations.

As little time as possible will be spent on the tour, and

if the route schedule is closely adhered to, it should be completed by October 24 at the latest. As a general rule, each day's flying will start at 7 a.m., and the day's distance will generally exceed 400 miles, and in some cases amount to more than 600 miles. Athens should be reached on October 11, and the return journey started on October 15.

Of the machines taking part, two are well-known standard types, namely, the "Bluebird" light aeroplane, which is in use in this country and abroad as a training and touring machine, and in addition to being the only light aeroplane which has flown round the world, with the exception of the Atlantic and Pacific Oceans (in the hands of the Hon. Mrs. Victor Bruce), won the King's Cup and Grosvenor Cup Air Races this year, and the "Lincok" single-seater light fighter which, in its latest metal form, has been adopted by foreign Governments, and in its earlier wooden form has been a feature of flying meetings in England and America. The "Segrave" is a new type developed from the "Segrave Meteor," designed to the specification of the late Sir Henry Segrave. It is a four-seater cabin monoplane having the same comfortable accommodation as a saloon car. Two de Havilland "Gipsy III" inverted engines, on either of which alone the machine can fly and maintain height, are mounted on the wing, which is attached under the fuselage, facilitating entrance to the cabin and giving an excellent view in all directions.

Designers Please Note!

The details of a new aircraft as given in a well-known aviation journal would appear to indicate that new and radically different processes of design are now at hand. The tail-unit, we are told, is of the cross-axle Vee-type the front legs of which incorporate oleo and compression

rubber springing—presumably to enable the pilot to wag his tail when pleased. Then, this machine's undercarriage is described as being of the normal monoplane type and having a welded steel-tube framework covered with fabric. Cantilever we suppose, to act as a sail when the wind blows!

Private Flying & Club News



The Bristol Garden Party

ON Saturday last, at the Bristol Municipal Airport at Whitchurch, the Bristol and Wessex Aeroplane Club held a Garden Party, to which owner pilots and club representatives from all parts were invited. The invitation met with ready response, and between twenty and thirty machines, bringing the guests, arrived during the course of the afternoon. Lt. Col. Shelmerdine, the Director of Civil Aviation, was prevented from attending through indisposition.

The civic authorities were represented by the Sheriff of Bristol and his wife, together with the Chairman of the Airport Committee, Alderman Sennington, who has done so much to further the aeronautical interests and needs of the city. Other visitors included delegates from the Portsmouth Corporation, who are at present studying conditions for the operation of their new municipal airport.

Although the affair was, from the guests' point of view, of an entirely informal social character, the aerodrome was opened for the general public to witness the proceedings. The more expensive enclosure was, by comparison, well patronised, but the poor support which the "popular" section received scarcely reflected the credit due to the organisers, who had arranged and well advertised a programme of attractive flying for the afternoon. This, to some extent, may be attributed to the dull and uncertain condition of the weather, and possibly to the fact that, to the "man in the street," the aerodrome is still not easily accessible, although one hesitates to suggest that the physical strain of a walk of a little over a mile, which is necessary from the nearest 'bus route to the aerodrome, causes sufficient mental bias to overcome any aeronautical complex which may be possessed.

Unfortunately, a pronounced mist hung over the aerodrome during the afternoon, so that performers were definitely handicapped in their aerobatics, although it in no way detracted from the general excellence of their evolutions. Visibility to the spectators, too, was somewhat restricted.

The proceedings commenced with an aerobatic display by F/O

W. N. L. Cope, the Bristol and Wessex Club instructor, in a Club "Moth," who, in view of the conditions, put up a very good show, to the obvious appreciation of everyone.

Next came a demonstration by Mr. Rawson, of the Cierva "Auto-Giro," in which he very effectively emphasised the abilities of the machine to make an almost vertical descent and land without any pronounced forward speed or resultant run.

Then came a demonstration of two of the new Comper "Swift" single-seater machines, fitted with the seven-cylinder 80-h.p. Pobjoy "R" engine. Messrs. Mayer and Selway were the pilots, and they displayed the capabilities of their small and comparatively light high-wing monoplanes in no uncertain manner. The ease of manoeuvrability of the machines, together with the thrilling evolutions which each pilot carried out, brought enthusiastic appreciation from the spectators.

An interesting event for visiting pilots was the next item on the programme. This took the form of an aerobatic competition, open to "A" licence pilots only. Each competitor was required to perform two specified evolutions, followed by one optional evolution. The specified evolutions consisted of two successive loops, followed by two stall turns, one of which was made to the right and the other to the left. In the case of the optional evolution, pilots were



Lady Page and daughter, Miss Joan Page, arrive at the Garden Party after flying from Hanworth in a "Genet-Redwing." Miss Page is an enthusiastic member of the Wiltshire Light Aeroplane Club.



Mr. C. F. Uwins, of the Bristol Aeroplane Co., gives the crowd a thrill during a demonstration of high-speed flying in a Bristol "Bulldog" Fighter.

required to inform the judges exactly what they were intending to do before leaving the ground. It was necessary for all aerobatics to be carried out at 1,500 feet, and, in the event of lost height, machines climbed again to the required level before proceeding. Altogether, this was an excellent event, which held the close attention of all. The judges, Mr. C. F. Uwins and F/O. W. N. L. Cope, awarded the first prize to F/O. Griffiths in the Parnall "Elf," and the second to Mr. A. D. Selway, flying a Comper "Swift."

Later, Lt. Christopher Clarkson, of the Aviation Department of Selfridge & Co., Ltd., took up his "Gipsy Moth" to give a further brilliant aerobatic display and an exhibition of inverted flight. This event proved of considerable interest to all present, particularly one long stretch of inverted flying.

Demonstrations of the Ford three-engined eighteen-seater and the Westland "Wessex" were cancelled from the programme, as both machines failed to put in an appearance. A formation flight by the three Club "A" licence pilots was also cancelled, to the disappointment of many.

Possibly the most eagerly awaited item of all came next. Mr. C. W. Uwins, of the Bristol Aeroplane Co., Ltd., gave an exhilarating exhibition of high-speed flying and aerobatics in a Bristol "Bulldog" single-seater fighter, fitted with the "Jupiter" engine. Roaring over the heads of the spectators in the enclosure to climb at an amazing angle, he demonstrated the capabilities of the machine to no uncertain degree. One particularly steep dive to within a few feet of the ground, immediately fol-

lowed by a fast and sheer climb, bore fitting testimony to pilot and machine alike. Mr. Uwins' evolutions were as perfect and neat as could be desired.

The last of the events in the nature of a landing competition was soon to follow. As previously, participation was limited to "A" licence pilots, each of whom had to make one landing from a height of 1,000 feet without the use of his engine below that height. Side-slipping was permitted, although not noticeably used. Competitors endeavoured to bring their machines to a standstill on a white chalk circular mark on the aerodrome. The winner was the pilot who succeeded in bringing his machine nearest to the mark—the distance being measured from the tailskid. Mr. R. E. H. Allen, in a Blackburn "Bluebird," carried off the premier award. He was three feet only from the mark. Mr. L. M. J. Balfour, flying a D.H. "Puss Moth," which landed 42 feet from the mark, was second. Messrs. R. Ashley Hall and J. Tratman were the judges in this event.

On the aerodrome, joy-riding in the Phillips and Powis Air Taxis continued until dusk.

Hosts and guests afterwards foregathered at the Spa Hotel, where the prizes were presented during a dance, which had been organised to terminate the proceedings.

Everything during the afternoon went off smoothly, and the stewards of the meeting, Captains L. P. Winters, R. M. W. Hall and Mr. L. Leaver, have every reason to be pleased with their efforts. Altogether, it was a very enjoyable afternoon's flying, and a happy termination of the Club's summer season.

BANBURY FLYING MEETING

THE Northamptonshire Aero Club has added one more meeting to its list of activities this year. On Sunday, September 27, the Club held a flying meeting at Banbury, about 27 miles from Northampton. Actually the principal idea was a small show, with good facilities for joy-riding. There has never been any aerial activity in Banbury before, so everyone turned up *en masse*, and enjoyed a really good flying programme. This consisted of a parade of aircraft, which included the "Moth," "Desoutter," "Klemm," "Redwing," "Avian," Avro, and "Comper Swift." Immediately afterwards each machine was demonstrated in turn.

The club instructor gave his usual polished display of aerobatics, and then F/O. David Lascelles, from the C.F.S., Wittering, who is also a member of the Aero Club, showed how easy it is to fly upside down. His inverted flying is really delightful to watch.

Very steady and excellent formation flying was done by Messrs. Palmer and G. Linnell and F/O. Lascelles.

F/O. Selway, who had "dropped in" in a "Comper Swift," was persuaded to go up and throw it about, which he did with great skill and abandon. The more one sees of a "Comper" the more in love with it one falls; it always appears the "Austin Seven" of the air, and looks as if it ought to be the ideal lady's machine.

As a contrast to the aerobatic performances, Mr. Lowdell, of Brooklands, went up and gave an exhibition of how "not to fly," which thoroughly amused the

crowd. The programme finished with a car bombing stunt, and the destruction of a hostile enemy fort from the air. The joy-riding planes were kept exceptionally busy until dusk, which all goes to show that there are heaps of people ready and anxious to fly in almost every town, and that these small flying meetings are always popular in places far removed from an aero club or aerodrome.

Miss Pauline Gower's "Spartan" had quite recovered from its indisposition at the Ladies' Meeting, and she was flying it very well and carefully. Both she and two planes from Brooklands were racing with the dusk, in their efforts to give everyone who wanted to fly a chance while the daylight lasted.

Among the visitors by air were the following:—"Moths," Miss Tyzack, Messrs. Parker, Muntz, Stark, Walker, Danson, Deterding, J. Linnell, G. Linnell, Wilson, Whittome, Lascelles, Harris, Palmer and Davis; "Avian," Mr. Bentley; "Klemm," Lord Willoughby de Broke; "Redwings," Miss Page and Flt. Lt. Russell; "Spartan," Miss Gower; "Comper Swift," Messrs. Selway and Mayer, and an air ambulance "Desoutter."

In view of the remarks made by many pilots about the dangerous flying at the Ladies' Meeting, be it noted that at Sywell no one tried conclusions with a tree. While at Banbury one pilot (male), who shall be nameless, came in to land with a large branch stuck in the front of his machine! More than enough, as was aptly said, to provide wreaths both for himself and his passenger!!

AVIATION AT BROOKLANDS.—Brooklands has fallen into line with the national effort towards economy. During the winter months a bonus of 20 per cent. on flying fees will reduce the costs of a flying course by one-fifth, and, bearing in mind that there are no entrance fees or subscriptions, it will be realised that this enables a ticket to be obtained at Brooklands on a basis comparable with the subsidised clubs.

Meanwhile attempts continue to keep Brooklands training as progressive as it has always been. Landing still remains the most difficult stage in the flying training system, and Brooklands instructors have been experimenting with the possibilities of a change in the orthodox methods of teaching the landing.

The method which is at present being tried out will consist of taking the "pupil" up to a safe altitude on a clear day. The instructor will give the command "check," and the pupil will then be instructed to move the control stick in the sequence necessary for a landing, beginning with the first gentle checking of the glide down to the moment the stick is right back.

Having familiarised the pupil with the general sequence and "feel" of the stick during a landing, the next step

is to give him that judgment of height and the moment to flatten out which is so difficult to teach. In orthodox instruction the pupil is told to give the first gentle check at 20 ft., but experience at Brooklands has shown that the average pupil is incapable of judging whether he is 20 or 100 ft. high. In the new method of instruction he will be told to make the first check when the ground changes from a flat map to a surface rushing up to meet him.

Having reached this stage, the instructor will take throttle and rudder, leaving the pupil with the stick only, and he will be told to concentrate on keeping the machine 2 or 3 ft. above the ground. Considerable practice will be given him in keeping the machine at this height with varying stick positions. For example, the instructor will open the throttle, when the pupil will have to move the stick forward, or close it, when he will have to move it back to maintain his height.

Those who have had experience of flying instruction will recognise that the object of the innovation is to give the pupil more concentrated experience first of the feel of the controls during a landing, and then of the movement of the controls necessary in relation to the ground.

Under present methods it is impossible to give any concentrated experience of these points owing to the necessity of taxiing, taking-off, and making a circuit between each landing.

Such an innovation, of course, can only be made gradually, and at present it is being tried out by the instructors on each other. The spectacle of instructors giving each other dual and landing practice has meanwhile furnished much matter for speculation and humour among the pupils. When the scheme has been put into practice over a period it will be possible to give a fuller report of its efficiency.

The instructors have sandwiched their experimental landing practice with flights on the Pobjoy-engined Comper "Swift," about which they are all enthusiastic.

The engine can only be described as silky. It runs right through all throttle settings without a single rough spot. The air frame is just one of those creations about which all good pilots dream. The fore and aft controls, aileron, and rudder are all perfectly balanced, and the combination of engine and machine should have a very bright future.

During the week-end Messrs. Davis Lowdell and Parker visited the All-Women's Flying Meeting at Northampton. The two former members of the staff were dressed up as women, and added perceptibly to the gaiety of those present.

The Hon. Mrs. Victor Bruce paid her old School a visit on Thursday last, and is as usual "full of beans" and as keen as ever on breaking records. Mr. J. R. Rowe, our latest Indian pupil, made an excellent solo on Wednesday last, and is now well on the way to his "A" licence.

AT HANWORTH.—A large party, composed of members of the British Association and their friends, visited Hanworth on Sunday. The weather was kind, the array of aircraft imposing, and the flying excellent. The visitors made a tour of the hangars and workshops, and at 15.45 Mr. L. M. Balfour opened the serious business of the day with a most light-hearted demonstration of the ease with which a "Puss Moth" could be controlled on the ground by means of its brakes. So light-hearted was his gyrating at full throttle, with one wheel practically locked, that a visitor was heard to express the somewhat scared opinion that he was not under control. Mr. Balfour's subsequent exhibition in the air should have put to rest any doubt as to his capabilities.

Space will not allow a detailed description of the remainder of the programme, but, if one reports that the pilots listed below demonstrated their respective mounts in the finished way that one has learned to expect from them, readers of *FLIGHT* will gather that the standard of flying was fairly high.

One of "Hannibal's" brethren or "friends and relations" appeared at intervals in the distance, but apparently saw someone he did not approve of, for he did not land. Two DH.9J.'s paid a short visit from the D.H. country seat at Hatfield during the afternoon, and an astonishing amount of joy-riding was done by the visitors after tea. Altogether, a very pleasant afternoon's entertainment, with none of the crowded atmosphere of the Pageant about it.

The "demonstrators" were Flt. Lt. Schofield ("Monospar"), Flt. Lt. Rawson ("Autogiro"), Mr. Penrose ("Wessex"), Flt. Lt. Uwins ("Bristol Bulldog"), Flt. Lt. Clarkson ("Comper Swift"), F/O. Leech ("Martlet"), Mr. Ashe ("Saro Cutty Sark"), Mrs. Victor Bruce ("Bluebird"), Mr. L. M. Balfour ("Puss Moth"), Mr. Rogers ("Klemm"), Mr. Lowe Wylde (glider, hand-launched, auto-towed and "Moth"-towed by Flt. Lt. M. H. Findlay).

NEW FLYING CLUB AT COLCHESTER.—The Colchester Branch of the Eastern Counties Aero Club at Blue Barns, Ipswich Road, Colchester, is now firmly established.

This Club is the result of two years' work on the part of Mr. J. Howie, the owner of Blue Barns Farm, and Mr. Roydon Wormell, who is Director and Hon. Sec.

The Aerodrome is situated very conveniently to the town, on the main Ipswich Road, and has excellent approaches in all directions. At the present moment one Hangar has been put up capable of taking three machines, but plans are in hand to erect four more hangars of double capacity.

Although the Club has only been going for three weeks, there are already 58 pilot members and 52 associate mem-

bers. The machines used for training are "Redwings" (Genet engines), and have proved themselves very good instructional machines. J. Goodyear, an R.A.F. instructor, is in charge of pupils, and is kept busy from 10 a.m. to dusk every day except Mondays. Subscription fees are 3 guineas for pilot members and 1 guinea for associate members. Service members are entitled to join as pilot members for 1 guinea. The cost of flying for members is £2 per hour, with solo flying £1 15s.

There is at present no club-house, but an attractive scheme is in hand to remove piece by piece and re-erect an old 16th-century timbered barn in Mr. Howie's farm for use as a club-house. There is no doubt that this is an excellent idea, as a most artistic effect will be achieved with the ancient wood, axe-hewn beams and thatched roof.

CINQUE PORTS FLYING CLUB.—Flying time for the week ending September 20 was 23 hr. 20 min. The weather during the week was mainly fine, and, in consequence, flying was possible on every day, which is nearly a record for this summer. Also the sun has persuaded several enthusiasts to join the Club and commence instruction with a view of obtaining their "A" licences.

On Wednesday, Mr. G. Bates, who only went solo about a fortnight ago, successfully carried out his tests for "A" licence, and is to be congratulated on his effort.

On Saturday, Lt. Com. T. S. B. Gubbins, with Mr. K. Waller as passenger, set off from Lympne to Chateau d'Ardennes, in Belgium, but they were forced by low cloud to return, as were several other private owners on their way to the same meeting.

THE PHILLIPS AND POWIS SCHOOL of Flying have had a record number of soloists in the first weeks of September. Eleven members have been launched. Two new private owners are Mr. P. de W. Avery, with a "Gipsy Moth," and Mr. C. L. Ward, with a "Cirrus Moth."

A little lesson may be learnt from a honeymoon taxi job, namely, rudders are not suitable brackets for old boots and iron horseshoes! In this case the pilot happily caught sight of the work of the well-meaning friends. But here is a chance for a far-seeing manufacturer to bring on the market "light-weight" tokens of good luck. Private owners and flying enthusiasts will be welcomed at the Club and School's dance on October 17, the first to be held at the new Clubhouse; tickets, price 5s. 6d., including buffet supper, can be obtained from the Secretary.

IRISH AERO CLUB.—During the past few weeks rapid progress has been made by the members of the Irish Aero Club, who are under the tuition of Mr. W. R. Elliott and several more "A" licences have been issued by the Department of Industry and Commerce to the pupils. There is a suggestion that the I.A.C. headquarters will shortly be transferred from Baldonnell to Collinstown, now being used by the Irish Aviation Company, but no official confirmation can be obtained at the moment. We have mentioned several times in these columns that the Free State Army Air Corps would be pleased to see civil flying transferred from Baldonnell and there is a rumour that the Department of Defence is likely to urge the Ministry for Industry and Commerce to take over Collinstown and establish it as a civil airport. The only snag in this scheme is the money, something like £15,000—£20,000 would be necessary for reconstruction work at Collinstown before it could be opened as an airport.

MOTORLESS FLIGHT CONFERENCE.—The delegates of some eight nations met in Conference in London during the last week of September to discuss Motorless Flight. They were entertained by the British Gliding Association and the members of the London Gliding Club, and on Thursday, October 1, the British Aviation Hospitality Fund, of which Viscountess Elibank is President, gave a reception for the delegates at Grosvenor House, Park Lane.

Mrs. Shelmerdine, wife of the Director of Civil Aviation, received the guests.

Among those invited were Lord Amulree, Secretary of State for Air, and Lord Wakefield, who recently gave £1,000 for the encouragement of gliding and sail-planing in this country.

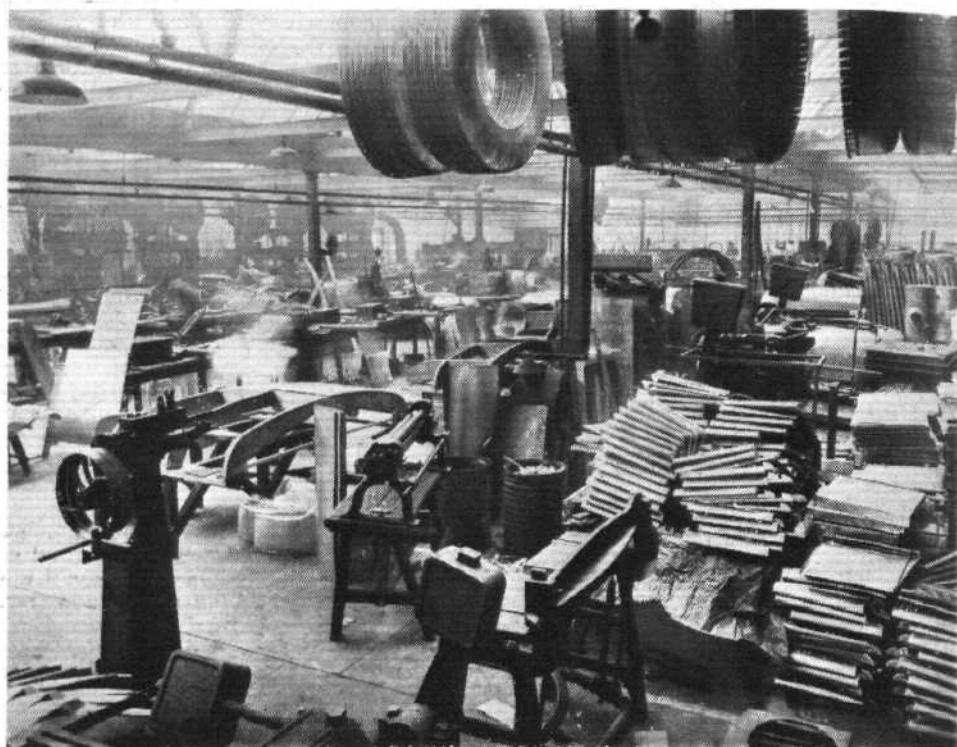
Mrs. R. Bentley, as Secretary of the Fund, was responsible for the success of the reception.

SHEET METAL WORK FOR AIRCRAFT

"EXPERIENCE and accuracy" are the two qualities that count in aircraft manufacture, according to the well-known advertisement of E. G. Brown & Co., Ltd., of West Road, Northumberland Park, Tottenham. The dictum is one which few will dispute, and after a visit to the works of E. G. Brown & Co. recently, to see for ourselves the kind of work being carried out there, we have come away with a feeling of surprise at the size and equipment of these works.

Situated somewhat out of the way, in that one wanders through various side streets to get to them from the High Road, Tottenham, the Brown works are laid out on a generous scale, and with ample surrounding space for further expansion as and when required. And, when one enters the works, one is struck at once with the magnitude and variety of the equipment of the plant. Here is no "tuppenha'peny" backyard factory where two men and a boy bash metal by hand, but an up-to-date works with all the latest machinery for the rapid and accurate production in quantity of almost any conceivable thing that could be made of sheet metal.

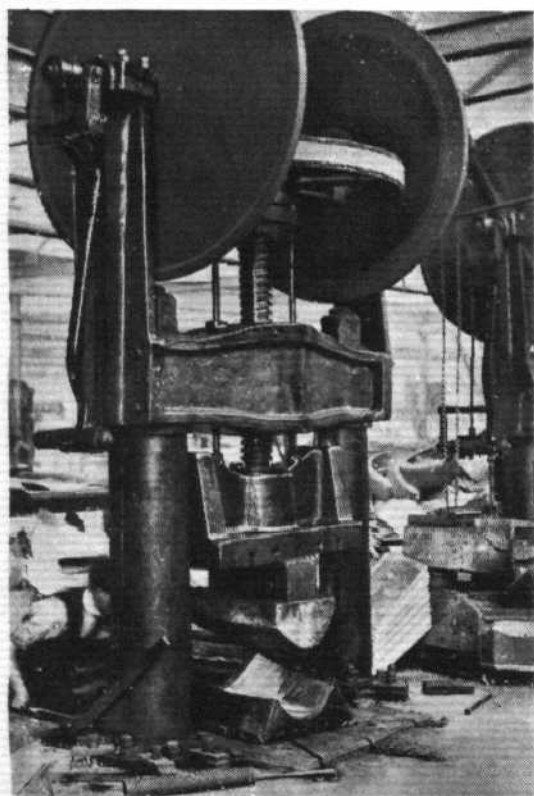
E. G. Brown & Co. do not limit themselves to any particular trade or industry. In fact, during our visit we saw work going forward on motor-car wings, gas and electrically-heated ovens, trays, panels for motor-car bodies, petrol tanks, pilot's seats, helmets for aero-engine cylinders, cowlings, spare tyre carriers, and a host of other articles too numerous to mention. It will readily be



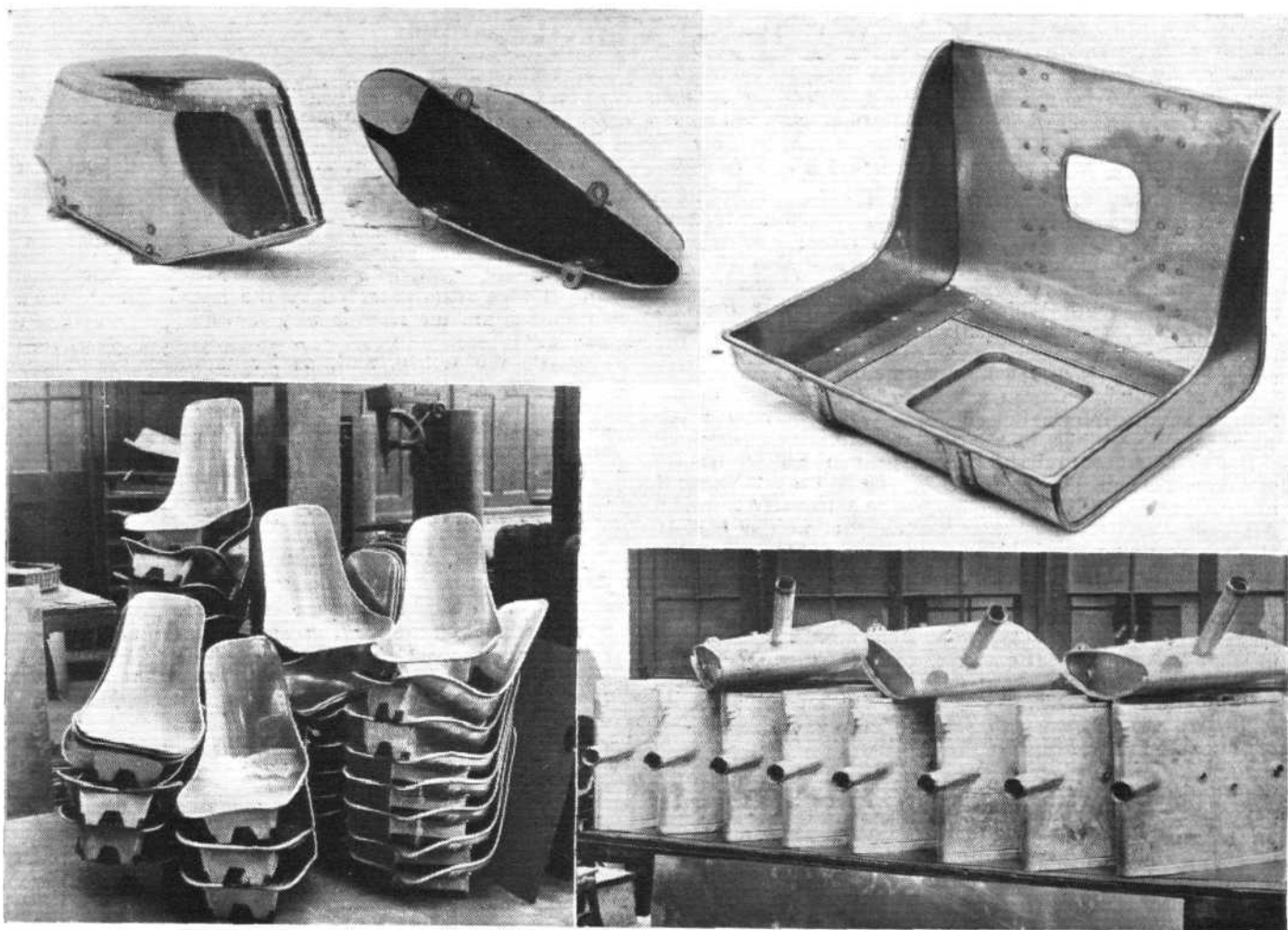
WORK IN PROGRESS: A general view in the Northumberland Park works of E. G. Brown & Co.

appreciated that there are many advantages in not being confined to any one industry. When, for any reason, work is apt to be slack in one industry, there is likely to be plenty of work in another. The result is that E. G. Brown & Co. have been able during the last two difficult years not only to keep their employees engaged, but actually to take on fresh workers. That is an achievement of which the firm may well be proud.

Another result of this continuity of work is that uniformity of quality can be, and is, maintained. It is obvious that in a factory where the volume of work fluctuates greatly, so that workers have alternately to be engaged and paid off, it is extremely difficult always to keep the same standard of skill and the same quality of workmanship. If it so happens that new hands have to be engaged, one cannot be certain that they are as skilful as those which had to be laid off. And even if the same workers *should* be available after a slack period, which is by no means always the case, absence from work for any considerable period is not likely to be beneficial to skill. By doing work for many industries, the firm is able, as



PRESSES LARGE AND SMALL: On the left, one of the big power presses used for shaping motor car wings. On the right a smaller power press and a number of hand presses.



SOME EXAMPLES OF AIRCRAFT WORK: On the left a batch of bucket seats, and on the right a number of fuel tanks. Above is seen, on the left, a type of cylinder helmets of which large numbers have been made, and on the right a parachute pack type of seat.

already stated, to keep its workers year in and year out, and the quality of the work turned out is correspondingly uniform.

Firms in the aircraft industry who have difficulty in keeping up to production would do well to get in touch with E. G. Brown & Co. about passing some of the sheet metal work on to them. The shops are well equipped for any kind of sheet metal work, but in particular are the shops laid out for press work.

If we mention that the presses in use by E. G. Brown & Co. include very large power presses by John Hands & Sons, of Birmingham, slightly smaller power presses by Bradley & Burch, of Ilford, and a large number of hand presses by Sweeney & Blocksidge, of Birmingham, it should suffice to show that work of almost any size and character can be undertaken. For the large power presses E. G. Brown & Co. have evolved some very ingenious dies,

and aircraft firms requiring pressings of special shapes will be able to get them done rapidly and accurately, and at reasonable prices.

That E. G. Brown & Co. do not confine themselves entirely to press work will be realised when we state that on our visit we saw a built-up axle for a motor lorry, in which electric welding had been used. The axle weighed very much less than did the corresponding cast axle, and we were informed that it could be sold a good deal cheaper.

Aircraft work is not confined to cowls, tanks and seats, and aircraft firms who use a number of pressed parts in the construction of wings and fuselages should be able to come to an arrangement with E. G. Brown & Co. for the production of them. No part is too small, and none likely to occur in an aircraft is too large, for this firm to tackle, and the standard of workmanship demanded by the directors of the firm is of a high order.

The Meteorological Office Annual Report

THE annual report of the Director of the Meteorological Office, presented by the Meteorological Committee to the Air Council, for the year ended March 31, 1931, has just been issued. The work of the Meteorological Office during the year has shown a steady increase, resulting from the greater use of meteorology which is made in many different spheres. The Office was especially occupied in carrying into effect the decisions made at three important conferences held in 1929, namely, the International Conference on Safety of Life at Sea, the Conference of Empire Meteorologists and the International Conference of Directors of Meteorological Services. These have involved certain changes in the collection of meteorological data, both from land stations and from ships at sea. Owing chiefly to the growing requirements of aviation, the system by which each country broadcast data for its own stations tended to become unworkable because of

interference, and arrangements have been made for the issue of grouped reports from powerful stations by the Meteorological Offices of France, Germany, Russia, Great Britain and the United States. The changes in the collection of reports from ships at sea are less fundamental, because the conferences accepted in the main the practices which had already been developed by the British Meteorological Office. During the summer of 1930 the organisation for the supply of meteorological information to airships was brought into action during the successful flight of R.100 to Canada and back, but on October 5 the Office suffered a great loss in the death of Mr. M. A. Giblett, Superintendent of the Airship Services Division, in the disaster to the R.101 on the flight to India. An important investigation into the structure of wind, on which the Division was engaged prior to these flights, was completed during the year. The Report (9d. net) may be obtained from H.M. Stationery Office, Kingsway, W.C.2.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

AUSTRALIAN AIR SERVICES

[2769] Having for the last few years been a constant reader of FLIGHT, having also always looked forward to your editorials, I was rather surprised to see a mistake re our airways in this country. It seems also that Norman Ellison, in his "Loop and Landings" columns of the Sydney (New South Wales) sporting paper, *The Referee*, dated Sydney, August 5, 1931, also noticed it, and burst into print on the matter; and, as what he has to say is correct, I have taken the liberty to copy his article word for word, and place it in the body of this letter, in the hope that the information contained therein may really show just how things in the air are here.

Before starting to write what Norman Ellison has to say, I would first like to say, as having had my "Wings" in first the "R.F.C." and later in the Royal Australian Air Force, and having taken a little part in the 1914-18 misunderstanding, and being taken as a target by the "Circus," I have been well and truly a "Mud Lark" ever since. But I simply still have to keep my eyes and mind on the "Game," and I would like to say that your magazine keeps me up to date and gives me a real interest in what is going on. It's good. I have, for one, certainly no fault to find; your articles at all times are worth reading, and your Royal Air Force section helps me to follow up the movements of many of my old friends of 1914, etc. Please keep up the good work.

Now for what the *Referee* has to say. By the way, the article is written on your editorial in the June 5 issue, page 492, second column, starting second para.: "There are other parts of the world . . . its chief commodity in such a country as Australia." The editorial in question deals with the maxims of Costes, French long-distance ace.

Now for it.

"FLIGHT, first aeronautical weekly in the world, and official organ of the Royal Aero Club, is usually a well-informed publication. But, judging by a recent editorial, it is not so well informed as it should be about Australia.

FLIGHT may not agree with the maxims of the famous Frenchman, without qualifications. Fair enough; but it says:—

Firstly, FLIGHT is wrong when it refers to the "very successful air lines of Australia." Where are they? True, Qantas and W.A. Airways give the public a really efficient service, all things considered. But would the services continue unless a fat Government subsidy was forthcoming? No, it is not correct; no civil enterprise can be termed "very successful," in the sense FLIGHT uses the phrase, unless it pays of its own operations—like, for instance, New Guinea Airways.

So far as service to the public was concerned, Australian National Airways was a "very successful" enterprise—its operations over three States only had one serious crash. But, to all intents and purposes, the company went out of the airline business.

And what of Australian Aerial Services, a pioneer in Australian air transport? Once their services also covered three States. But they, too, lost the bulk of their business when the subsidies were not forthcoming.



"When the Swallows Homeward Fly"—by Aeroplane

From the reports received from Vienna, it would seem that in years to come it may not be an uncommon sight to see, when summer is ended, queues of swallows waiting at our airports to embark on the "Swallows' Southern Special." It appears that swallows on their way south from Northern and Central Europe have been held up in Austria by the premature winter weather conditions prevailing there. Thousands of the poor creatures, chilled by the extreme cold and rain, and unable to obtain food, sought shelter in barns, factories and other buildings—many dying from exposure and lack of food. Then man—in the form of the Viennese Society for the Protection of Birds and Animals—came to the aid of nature with a plan to assist the stranded migrants over the Alps into Sunny Italy by means of aeroplanes—although there is little money to spare in Austria just now for the expense involved.

We in Australia, then, are rather mystified about these "very successful services" of ours.

Likewise about that "cheapness of travel," also accredited to Australian aviation. Definitely, air travel in Australia is not cheap—as compared with other forms of transport. But, as a time-gainer, it does score heavily. And it taps areas unserved by the train. Those, and not cheapness, are the reasons why it wins the support of the public."

That's the article, and, as far as we in Australia are concerned, it's true.

Kingsford-Smith's line, National Airways, couldn't carry on without Government help, and, unfortunately, it's the only way air lines can carry on out here.

I hope Norman Ellison's article may help you in seeing how things in the air business are in Australia.

Here's wishing many more sales for FLIGHT.

JOHN J. SMITH.

Dandarragan, Western Australia.

August 18, 1931.

[We are much obliged to our correspondent for his appreciative letter. We can assure him that we are not in the least ignorant that the two main air lines in Australia are subsidised. So, we believe, are all air lines except those in New Guinea and Colombia. In comparison with other subsidised air lines, we hold to our expressed belief that those of Australia are "very successful." The "Referee" has evidently quite misunderstood our remarks about cheapness. We did not allude to fares, but to cost of laying out an airway as compared with the construction of a railway. Obviously, Australia finds that in undeveloped parts airways come cheaper.—ED.]

AIR SCOUTS' ASSOCIATION

[2770] I would esteem it a favour if you would publish the following in your most valuable paper.

With reference to Mr. W. Davison's letter regarding the above, I would like to point out that the letters we have received are so numerous that it is impossible to reply to them all personally, and we would like to thank the senders for their interest in this movement; we will notify them as soon as a company is to be formed in their districts.

Efforts are being made for an air pageant to be staged in the near future on the Tees-side in the hope of raising funds to carry forward this worthy movement; it is hoped that a number of private owners will give their services, together with clubs.

Hon. members are enrolled at 10s.; patrons £50; scouts, whose ages must not exceed 21 years, £1 per annum, where instructors and captains can be found.

Surely there are plenty interested in aviation who will support this movement.

Those willing to bring their machines and give displays, joyrides, etc., or help in any other way should communicate with the undersigned.

A. R. MARSHALL,

Hon. Secretary.

59, Woodlands Road,
Middlesbrough,

August 28, 1931.

Thousands of the birds have been collected from all parts of the country, fed (not without difficulty) and placed in specially-prepared crates, and on September 26 a machine of the Austrian Air Transport conveyed 20,000 of them, free of charge, to Venice, where some nine-tenths of the consignment survived the journey and were released. A further 25,000 were despatched the next day, and the good work was continued thereafter. It was found subsequently that Venice was not the best locality for sending the swallows on their way South—for they were faced, in their weak state, to crossing the Adriatic. Later consignments were, therefore, transported by way of Buckarest to Braila, near the Black Sea, whence they could proceed via South Russia to Egypt, etc. The Vienna Animals' Protection League, at Heidenschütz, Vienna, asks bird lovers of all countries to send small contributions towards the expense it has incurred—to which we add "Hear, hear." Well done, Austria!!

THE ROYAL AIR FORCE

London Gazette, September 22, 1931

General Duties Branch

The follg. are granted short-service commns. as Pilot Officers on probation with effect from and with seny. of Sept. 11:—G. Atkinson, G. A. Bartlett, W. E. Cameron, R. L. Crossman, J. W. Donaldson, M. H. Dwyer, D. Y. Feeny, J. Goodhart, J. Grandy, J. H. Heyworth, J. G. de V. Hunt, P. A. Hunter, M. A. Lunnion, L. W. Oliver, A. A. Saw, W. L. Stewart, L. F. J. Taylor, L. M. B. Vickers, R. B. Young, J. F. L. Zorn. Flight Lt. I. A. Bertram is granted a permanent commn. in this rank (Sept. 15).

The follg. Pilot Officers on probation are confirmed in rank:—A. W. Vincent (April 7); J. R. S. Agar, E. D. A. Bigg, G. R. Brice, T. H. Burleigh, F. Crump, P. F. Foss, A. H. Garland, M. V. Gibbon, T. P. Gleave, P. W. Johnson, J. N. McAuley, G. E. Bullen Nixon, P. J. Polglase, G. F. A. Skelton, C. G. Skinner, A. Taylor, J. A. Tester, R. Williams (Sept. 12). The follg. Pilot Officers are promoted to rank of Flying Officer:—M. F. Summers (June 27); H. M. Bowes-Lyon (Aug. 3); F. G. L. Bain, G. S. Barrett, H. I. Dabinett, G. A. C. Foster, R. L. Kippenberger, the Hon. F. D. H. Lea Smith, M. P. Price, J. H. Supple (Aug. 21).

The follg. are placed on retired list at their own request:—Squadron Leader D. S. Don, M.V.O. (Sept. 23); Flight Lt. H. A. Castaldini (Sept. 20). The follg. Flying Officers are transferred to Reserve, Class A (Sept. 18):—H. C. D. Hayter, D. S. King, C. K. Turner Hughes, G. R. Weighill. Lt. the Hon. J. M. Southwell, R.N., Flying Officer, R.A.F., relinquishes his tempy. commn. on return to Naval duty (Sept. 10).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Air Commodore H. le M. Brock, C.B., D.S.O., to No. 22 Group H.Q., S. Farnborough, pending taking over command, 14.9.31.
Group Captain E. L. Gossage, D.S.O., M.C., to H.Q., Air Defence of Gt. Britain, Uxbridge, for duty as Senior Air Staff Officer, 29.8.31.

Wing Commanders: J. H. Herring, D.S.O., M.C., to Special Duty List, on appointment as Air Attaché, Berlin, 29.8.31. W. H. Dolphin, to H.Q., Fighting Area, Uxbridge, for Engineer Staff duties, 3.9.31.

Squadron Leaders: D. O. Mulholland, A.F.C., to Station H.Q., Manston, 1.9.31. J. F. Gordon, D.F.C., to Air Ministry (D.P.S.), 15.9.31.

Flight-Lieutenants: J. I. T. Jones, D.S.O., M.C., D.F.C., M.M., to No. 1 Air Defence Group H.Q., 9.9.31. A. T. S. Leguen de Lacroix, to No. 3 Flying Training School, Grantham, 9.9.31. M. C. Dick, A.F.C., to No. 22 Group H.Q., S. Farnborough, 13.9.31. W. C. Yale, to R.A.F. College, Cranwell, 16.9.31. J. B. M. Wallis, to R.A.F. College, Cranwell, 14.9.31.

Flying Officers: N. E. White, to Central Flying School, Wittering, 7.9.31. F. C. Tracey, to No. 13 Sqn., Netheravon, 8.9.31. J. Beaumont, to Central Flying School, Wittering, 14.9.31.

Pilot Officers: T. P. Gleave, to No. 1 Sqn., Tangmere, 8.9.31. P. F. Foss, to No. 2 Sqn., Manston, 8.9.31. R. A. McDonald, to No. 3 Sqn., Upavon, 8.9.31. F. R. Dix and C. G. Skinner, to No. 12 Sqn., Andover, 8.9.31. H. Ford, A. H. Garland and R. Williams, to No. 13 Sqn., Netheravon, 8.9.31. M. V. Gibbon, to No. 17 Sqn., Upavon, 8.9.31. T. H. Burleigh, to No. 19 Sqn., Duxford, 8.9.31. G. E. B. Nixon, to No. 23 Sqn., Kenley, 8.9.31. G. R. Brice, to No. 36 Sqn., Catterick, 8.9.31. J. R. S. Agar, to No. 29 Sqn., North Weald, 8.9.31. G. F. A. Skelton and P. H. Heygate, to No. 32 Sqn., Kenley, 8.9.31. J. A. Tester, to No. 33 Sqn., Bicester, 8.9.31. A. Taylor, to No. 40 Sqn., Upper Heyford, 8.9.31. P. W. Johnson,

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Staff Nurse Miss K. F. Woodcock is promoted to rank of Sister (Aug. 8).

ROYAL AIR FORCE RESERVE

General Duties Branch

Flying Officer C. E. B. Winch is transferred from Class A to the Special Reserve (Aug. 24). The follg. are transferred from Class A to Class C:—Flight Lt. M. D. Barber (Feb. 4); Flying Officer L. G. Gray (June 30); Flying Officer N. McLeod (July 1). Flying Officer J. J. W. Nicholson, D.F.C., is transferred from Class B to Class C (Dec. 15, 1930); Flying Officer K. C. Netherton relinquishes his commn. on appointment to a commn. in the Regular Army (Aug. 28).

Stores Branch

Flight Lt. T. Surr relinquishes his commn. on completion of service, and is permitted to retain his rank (June 17).

Special Reserve

Flying Officer C. E. B. Winch is transferred to Reserve, Class A (Sept. 6).

AUXILIARY AIR FORCE

General Duties Branch

No. 602 (CITY OF GLASGOW) (BOMB) SQUADRON.—Flight Lt. D. F. McIntyre is attached to Regular Air Force from Aug. 12 to April 19, 1932, inclusive.

J. N. McAuley, H. L. M. Glover, H. E. Slowey and W. G. A. Coulson, to No. 41 Sqn., Northolt, 8.9.31. P. J. Polglase, to No. 43 Sqn., Tangmere, 8.9.31. E. D. A. Bigg, to No. 56 Sqn., North Weald, 8.9.31. F. Crump, to No. 111 Sqn., Hornchurch, 8.9.31. J. G. Cardale, to No. 13 Sqn., Netheravon, 9.9.31. D. C. T. Bennett, to No. 29 Sqn., North Weald, 10.9.31. N. B. Littlejohn, to No. 17 Sqn., Upavon, 10.9.31. C. H. Smith, to No. 3 Sqn., Upavon, 10.9.31. The undermentioned are posted to R.A.F. Depot, Uxbridge, on appointment to short service commns., on probation with effect from 11.9.31:—G. Atkinson, G. A. Bartlett, W. E. Cameron, R. L. Crossman, J. W. Donaldson, M. H. Dwyer, D. Y. Feeny, J. Goodhart, J. Grandy, J. H. Heyworth, J. G. de V. Hunt, P. A. Hunter, M. A. Lunnion, L. W. Oliver, A. A. Saw, W. L. Stewart, L. F. J. Taylor, L. M. B. Vickers, R. B. Young, and J. F. L. Zorn.

Stores Branch

Wing Commander W. E. Aylwin, O.B.E., to No. 4 Stores Depot, Ruislip, pending taking over command, 1.9.31.

Flight-Lieutenants: E. L. Ridley, to H.M.S. Courageous, 4.9.31. F. A. R. Smith, to Armament and Gunnery School, Eastchurch, 15.9.31.

Accountant Branch

Flight-Lieutenant S. C. George, to Station H.Q., Netheravon, 7.9.31.
Flying Officers: D. C. Stone, to Aeroplane and Armament Experimental Estab., Martlesham Heath, 11.9.31. R. F. Fleming, to No. 504 Sqn., Nottingham, 26.8.31.

Medical Branch

Flight-Lieutenants: M. J. Cahalane, to R.A.F. Depot, Uxbridge, 23.9.31. A. R. French, to Palestine General Hospital, Sarafand, 26.8.31.
Flying Officer E. K. Pritchard, to Station H.Q., Tangmere, 25.9.31.

Royal Air Force College, Cranwell

The following flight cadets successfully completed on July 24 their course of training at the Royal Air Force College. The names are arranged in alphabetical order:—Addenbrooke, D., Andrews, L. V., Brown, L. F., Chesterman, H. W. A. (Joint winner of Air Ministry Prize for Humanistic Subjects), Drew, P. E., Halliday, N. A. R., Ingham, E. C., Jackson, N. H., Johnstone, A. C. (Joint winner of Air Ministry Prize for Humanistic Subjects), Ling, C. W. M. (Winner of Sword of Honour), MacNair, D. I. P., McIlwaine, A., Messenger, A. D. (Winner of J. A. Chance Memorial Prize), Oliver, J. O. W., Oulton, W. E. (Winner of Abdy Gerrard Fellowes Memorial Prize), Page, R. H., Read, G. J. L. (Winner of R. M. Groves Memorial Prize), Rutter, N. C. S. (Winner of Air Ministry Prize for Aeronautical Engineering), Shearn, A. C., Stainthorpe, W. W., Stokes, F. E., Turner, W. H. N., Welch, W. P., Widdows, S. C., and Williams, C. W.

In addition to the above, the undermentioned flight cadet has passed the examination, but will return to the college to complete flying training:—Daubney, F. C.

Curtis Memorial Prize, 1931

The Curtis Memorial Prize for 1931 has been awarded to Corporal Nicholls, A.T., H.A.D., Henlow. This prize is awarded from funds subscribed by members of the R.A.F. Educational Service as a memorial to the late Colonel Ivor Curtis, C.B.E., M.A., A.M.I.Mech.E., who was Educational Adviser to the Air Ministry from 1918 to 1928. The prize is awarded annually to the candidate receiving the R.A.F. Educational Certificate, who is adjudged by the Air Ministry to be the best candidate for the year. In awarding the prize, the performance (marks, class, distinctions) in all three parts of the examination has been taken into account. The award, therefore, signifies that of those who have been awarded the R.A.F. Educational Certificate in 1931, the candidate named above has the best cumulative record in the Higher Education Test.

Reduced Pay in R.A.F.

The following announcement was made by the Prime Minister in the House of Commons on September 21:—

"The Government has, as announced by me on Wednesday last, been examining details of the proposed scheme of reductions. There are undoubtedly classes of persons who are unfairly affected, and the Government has, in view of all the circumstances, come to the conclusion that the simplest way of removing just grievances is to limit reductions as regards teachers, police, and the three defence services to not more than 10 per cent. This decision will not apply to the higher

ranks of commissioned officers in the defence services. The balance of the Budget will be maintained."

In accordance with this decision, the Air Ministry announces that in those cases where under Air Ministry Order A.176/1931 the transfer of officers and airmen of the regular Air Force to the 1925 rates of pay would involve a reduction of more than 10 per cent. on current rates, their rates of pay will be adjusted so as to limit such reductions to 10 per cent. In other cases the 1925 rates will be applied as laid down in the Order. An Air Ministry Order promulgating this decision will be issued as soon as possible.

No. 2 Flying Training School

The undermentioned officers and airman pilots have been awarded special assessments on completion of a course of *ab initio* flying training at No. 2 Flying Training School:—*Distinguished Pass*: Sergt. R. B. Bryan, Flying Officer G. S. Hindmarsh, Sergt. H. W. Edwards, Pilot Officer R. B. Brown, and Pilot Officer D. G. Morris.

Attachment of Foreign Officers to R.A.F. Units

The following foreign officers are being attached to Royal Air Force units:—

Flight-Lieut. C. O. Sparre (Swedish Air Force), No. 100 Squadron, Donibristle.
Capt. Beckhammar (Swedish Air Force), R.A.F., Heliopolis.
Lieut. O. Steinberg (Latvian Air Force), School of Army Co-operation.
Lieut. E. Rasmussen, of the Danish Naval Air Service, is being attached to the following Royal Air Force units in order to study the organisation and work carried out:—September 7–11—Royal Air Force Station, Tangmere; September 14–19—Royal Air Force Station, Bicester; September 22–26—Royal Air Force Station, Donibristle; September 28–October 3—Royal Air Force Station, Hornchurch; October 5–9—Central Flying School.

THE ROYAL AIR FORCE MEMORIAL FUND

The usual meeting of the Grants Sub-Committee of the Fund was held at Iddesleigh House on September 4. Mr. W. S. Field was in the chair, and the other member of the Committee present was Air Commodore B. C. H. Drew, C.M.G. The committee considered in all 10 cases, and made grants to the amount of £227 7s.

At the meeting held on September 17, Mr. W. S. Field was in the chair, and the other members of the Committee present were: Mrs. L. M. K. Pratt Barlow, O.B.E., Mrs. F. V. Holt, Sqn.-Ldr. A. H. Wann. The Committee considered in all five cases, and made grants to the amount of £118 18s. 6d.

AIR POST STAMPS

By DOUGLAS ARMSTRONG

Air Stamps Appreciation

AIR stamps are "up" again, all round, in the new editions of the stamp dealers' catalogues for 1932; nor is there any indication that they have yet reached their zenith. On the contrary, the upward movement in certain instances is so progressive that no hard-and-fast quotation is possible, since every specimen that comes on to the market changes hands at an enhanced figure. This applies particularly to the rarer examples, such as the "Hawker" and "De Pinedo" air stamps of Newfoundland in mint condition, the last recorded auction prices for which are £250 and £225 respectively. As instancing what an extraordinarily good investment these two stamps have proved, it may be recalled that less than five years ago it was possible to pick up a mint "Hawker" in the open market for something like £50, while the "De Pinedo" was going begging at between £30 and £40!

The latest prices for "used" copies of the same items (presumably on "flown" cover) are £200 for the former and £80 for the latter, both of which strike one, however, as being a trifle on the high side in the light of recent auction-room realisations.

The "Columbia" air mail stamp of 1930 is now priced at £100 unused (something like its true value) and £90 used, which as yet is rather over the odds.

All the Newfoundland air stamps have been advanced; in fact, including the *inverted* error of the "Halifax" issue, now standing at £75, as against £50 only last year. The extremely rare manuscript "Martinsyde" overprint is listed by Stanley Gibbons for the first time, but unpriced. Three hundred pounds is a fair estimate of its actual value. Perhaps the most sensational rise of all is in the solitary official air post stamp of Columbia, issued on June 18, 1919, which has taken a sudden leap from £25 to £125 in mint condition and from £16 to £50 used. As there are believed to be no more than 40 or 50 unused specimens extant, the former quotation may be justified. On the other hand, "flown" covers have sold within the last few months for considerably under the second figure.

The 24 cents U.S.A. air mail stamp of 1918, with centre printed topsy-turvy, maintains its proud position as the world's most valuable air stamp at £500 a copy.

South American Novelties

Air post collectors, whose interest centres round the "flown cover," as opposed to aero-philatelists who are primarily concerned with adhesive stamps, will want to add to their collections examples of letters carried to South America and back by the Dornier flying-boat "Do.X." on her protracted, but ultimately successful, flight. Special cachets were applied both at Friedrichshafen on departure and at Rio de Janeiro, where she arrived on June 22 of this year. It is known also that a small unofficial mail was taken on board at Calshot, when she touched there last spring, but nothing more seems to have been heard of it. Aero-philatelists have also been provided with a souvenir of the "Do.X." venture in the form of a commemorative overprint which was struck on the contemporary air post stamps of Surinam when she called at Paramaribo en route for New York and home.

The second South American flight of the dirigible *Graf Zeppelin* is recorded in special stamps issued by the post offices of Brazil and Paraguay respectively for use on mail brought back to Europe on the return voyage. In the case of Brazil, they consist of the current 200 and 300 reis air post stamps overprinted with the single word "Zeppelin" and surcharged with the new values 2,500 and 5,000 reis. Simultaneously, Paraguay adapted her existing 4-pesos postage stamp showing a map of the country, by adding the outline of an airship in black between the inscription "Correo Aereo—Graf Zeppelin" both with and without the addition of a new 3-pesos.

In connection with the reopening of the Asuncion-Buenos Aires air post line on August 1, 1931, additional air post stamps in five denominations appeared in Paraguay, lithographed at the State Printing Office in pictorial designs by Herr Carlos Rocholl, and comprising 5 centavos greenish-blue (aeroplane over national war memorial, flanked by palm trees), 10 c. violet (winged insignia, flanked by orange tree and banana plant), 20 c. scarlet (aeroplane and yerba plant), 40 c. yellow-green (aeroplane over palm grove), and 80 c. blue (Condor in flight). These stamps are available solely for the local service, the higher denominations already issued being reserved for the Trans-Atlantic air mail route.

PUBLICATIONS RECEIVED

Royal Air Force: Aircraft Route Book. Part III. Calcutta to Singapore. London: H.M. Stationery Office, W.C.2. Price £1 net.

Regulations for Admission to the Royal Air Force College, Cranwell. Air Publication 121. London: H.M. Stationery Office, W.C.2. Price 1s. net.

Air and Aviation Law (Civil Aviation). By Wm. Marshall Freeman. London: Sir Isaac Pitman & Sons, Ltd. Price 7s. 6d. net.

U.S. National Advisory Committee for Aeronautics Technical Notes: No. 378, Comparison of Weights of 17s.t. and Steel Tubular Structural Members Used in Aircraft Construction. By E. C. Hartmann. May, 1931. No. 379, *The Pressure Distribution Over a Semi-circular Wing Tip on a Biplane in Flight.* By R. V. Rhode and E. E. Lundquist. May, 1931. No. 380, *A Suggested Method for Measuring Turbulence.* By C. F. Taylor. June, 1931. No. 381, *Endurance and Other Properties at Low Temperatures of Some Alloys for Aircraft Use.* By H. W. Russell and W. A. Welcker, junr. June, 1931. No. 382, *Basic Requirements of Fuel-Injection Nozzles for Quiescent Combustion Chambers.* By J. A. Spanogle and H. H. Foster. June, 1931. National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

U.S. National Advisory Committee for Aeronautics Reports: No. 375, Full-Scale Tests of Metal Propellers at High Tip Speeds. By D. H. Wood. Price 15 cents. No. 381, *Static, Drop, and Flights Tests on Musselman-Type Airwheels.* By W. C. Peck and A. P. Beard. Price 15 cents. National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

The Naft, A.P.O.C. Magazine. Vol. VII. No. 4. July, 1931. Anglo-Persian Oil Co., Ltd., Britannic House, Finsbury Circus, London, E.C.2.

NEW COMPANY REGISTERED

SKYWORK LIMITED.—Capital £3,000 in £1 shares. Objects: To promote, assist and encourage aerial navigation in all its forms, the study of aeronautics, and the development of all sciences connected therewith, and the construction of aerial conveyances or parts: aeronautical engineers and advisers, etc. Directors:—J. Tranum, Royal Aero Club, W., professional aviator; O. Garden, c/o Vacuum Oil Co., Westminster, professional aviator. Solicitors: W. R. J. Hickman, Randall & Stammers, 3, South Place, E.C.2.

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- 34581. A. MODIANO. Protective helmets for aviators. (356,578.)

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- 791. SIR F. H. ROYCE. Regulating means for internal-combustion engines for aircraft. (356,619.)

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